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Julia van Helmond March 23, 2021

The Effect of Medicaid Expansion on the Accessibility of Facilities Offering Mental Health Services

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Abstract

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Medicaid is the principal payer of behavioral health services in the U.S. and has been shown to increase healthcare utilization while decreasing the likelihood of having an unmet need for these services. Still, significant barriers remain in the provision of mental health care, including inadequate reimbursements to both primary care providers and mental health specialists, low rates of insurance acceptance by specialists, and an uneven distribution of resources. The objective of this paper was to examine the effect of the Medicaid Expansion program on state-level accessibility to facilities offering mental health services. Locational data for these facilities was obtained from the facility directories published yearly by the Substance Abuse and Mental Health Services Administration. Regression models with state fixed effects were used to estimate the treatment effect using a difference in difference identification strategy. Various measures of accessibility were considered, including the number of facilities in a state weighted by population estimates, and the proportion of a state's population living in a zip code with at least one facility. An initial descriptive analysis of the data supported several findings from prior research, such as the generally uneven distribution of mental health resources across the U.S. and significant disparities in accessibility according to urban status. Average accessibility scores showed slightly greater increases in expansion states, especially during the first two years following enactment of the program. In general, however, results were not suggestive of any large difference between the two groups of states with regards to changes in state-level accessibility. This paper also considered several potential heterogeneities in the effect of the expansion program on mental health care accessibility according to certain facility characteristics. The average accessibility of facilities offering services in an outpatient setting increased more in expansion states, which may be in part due to the increasing role of primary care physicians in the provision of mental health services. Results suggest several policy interventions, including more widespread adoption of integrative and collaborative care models, as well as targeted reimbursement policies that encourage Medicaid-acceptance and allow for growth of the mental health care system across various service settings.

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Introduction

Behavioral health care, which comprises services for both mental health and substance abuse disorders, is integral to the attainment of good health for both individuals and the general population. Despite improvements in the amount of attention paid to these disorders, significant barriers continue to exist for people suffering from mental health disorders. Stigma surrounding behavioral health makes it challenging to emphasize the importance of good mental health in achieving overall well-being and may present a barrier to treatment for patients that could benefit. Access to these services is often underdeveloped compared to resources available for physical health concerns despite the fact that patients with mental health disorders frequently have comorbid physical conditions. Mental health disorders have important economic effects on communities including diminished productivity and educational attainment. When left untreated, these disorders can lead to overcrowding in jails and prisons.[1] Expenditures on mental health care treatments are expected to continue to rise, suggesting the need for improved models of care provision to both improve health outcomes and reduce costs. Emphasizing the importance of addressing mental health concerns in addition to physical health problems and developing systems that can overcome barriers in the provision of relevant services will be necessary to more effectively meet the needs of people with mental health disorders in the U.S.

This paper proposes an analysis of any potential state-level changes in mental health care accessibility as a result of the Medicaid Expansion program. By comparing states that enacted the program in 2014 with those that have not yet expanded Medicaid, this paper will observe changes in accessibility after starting the program. Any potential improvements in accessibility as a result of the program may be especially pertinent to rural counties with high rates of minorities, as these are the areas found to be most at risk of being mental health service shortage areas. The additional beneficiaries that qualify for Medicaid under the expansion program create increased demand for mental health services, which may prompt the opening of new mental health facilities, especially in areas without any prior

[1] "Increasing Access to Behavioral Health Care Advances Value for Patients, Providers, and Communities," *American Hospital Association*, May 2019, https://www.aha.org/system/files/media/file/2019/05/aha-trendwatch-behavioral-health-2019.pdf.

accessibility. However, if this demand is being met instead by general health facilities due to better reimbursement rates or higher rates of Medicare-acceptance, it is possible that geographic accessibility to mental health facilities may not change or may even become worse. By considering what types of facilities are opening or closing after the implementation of the Medicaid Expansion program in comparison to non-expansion states, this paper will examine which types of service settings are absorbing the increased demand for mental health services, and whether the structure of the local mental health care market changes as a result. Given the data available, it is possible to look at changes in accessibility that may arise according to certain facility characteristics such as types of services offered, primary focus, and insurance plans accepted. For example, this paper will examine any changes in the proportion of facilities which accept Medicaid as a result of the expansion program and in the proportion of facilities offering outpatient services rather than inpatient or residential options.

Although the demand for mental health services has been increasing in recent years, there is still a significant amount of unmet need, as only about 43% of U.S. adults with a mental illness received treatment in 2018 (NAMI, 2021). There are significant economic costs associated with mental disorders, both direct and indirect. Poor mental health has been linked to higher rates of healthcare spending as well as reductions in per capita income growth, especially in low-income and rural areas (Davlasheridze, 2018). These disparities are especially problematic since these individuals already face limited opportunities and are more often uninsured. The structure of the mental health care system has shifted in relatively recent times, especially with regards to the types of treatment settings used to address mental health problems. The percent of treatment episodes taking place in inpatient settings has dropped by 71% between 1955 and 2012, with significantly less funding going towards forms of residential care settings. Much of this trend may be due to the tendency of insurance plans to exclude inpatient services, resulting in a shift towards facilities and services which are not exempted from these plans (Glied, 2016). Mental illness itself is a broadly defined term and the list of potential treatment services for related disorders varies tremendously. Furthermore, mental health care has shown to respond differently to economic forces than general health care, likely as a result of social stigma surrounding mental illness and the

frequently chronic nature of these conditions. Perhaps as a result of the perception that mental health related disorders are less acute than many other general health problems, mental health care has shown to have a higher price elasticity than general health care (Lambregts, 2018).

There are substantial obstacles in attaining appropriate levels of treatment for mental health including negative perceptions of the disorders themselves as well as certain structural aspects in the supply-side of service provision. These barriers are especially concerning for uninsured individuals and those with low incomes or disabilities living in rural regions, which frequently lack sufficient access to facilities designated for mental health services.[2] Insufficient funding to community mental health centers and the closure of many state psychiatric hospitals have left many areas without access to facilities and providers primarily designated for mental health care. As a result, primary care physicians have played an increasingly important role in outpatient mental health care. One study claims that "two thirds of primary care physicians report that they cannot secure outpatient mental health referrals for their patients with mental health problems" (Olfson, 2016). Psychiatrists are commonly clustered in urban areas and there has been slowing growth in the number of active psychiatrists. Primary care physicians have begun prescribing psychotropic medications at a higher rate and modern models of care have increasingly focused on ways to provide mental health care to primary care patients. Especially following the ACA, the development of integrated and collaborative care models became increasingly popular (Olfson, 2016). These integrated models are thought to offer more cost-effective care through better coordination and information exchanges (Okunade, 2007). Since the data used in this paper encompasses a range of facility types, the analysis will incorporate hospitals that offer integrated physical and mental health services. Increasing the availability of mental health treatments within primary care settings presents the opportunity to improve access to comprehensive care without the excessive infrastructure costs associated with building entirely new spaces. Whether or not the rising trend in integrated care models contributes to

[2] Janet R. Cummings, Lindsay Allen, Julie Clennon, Xu Ji, and Benjamin G. Druss, "Geographic access to specialty mental health care across high- and low-income U.S. communities," *JAMA Psychiatry,* 2017*,* 74, 476-484.

increases in the overall availability of facilities offering mental health services will be relevant to this analysis.

Another potential obstacle to increasing the accessibility of mental health specialists is the tendency of insurance benefit plans to consider mental health treatments from these specialists as separate from comparable services performed by primary care physicians. Research has found that in-network mental health providers are paid less than other specialists and that mental health care was more likely to occur out of network as compared to other forms of health care (Pelech, 2019). As a result, fewer mental health specialists accept insurance; one study looking at the rates of physicians accepting new patients by insurance type demonstrated that insurance acceptance rates for psychiatrists were lower than for all other physician types considered. These results applied to private fee-for-service plans as well as Medicare and Medicaid plans (Bishop, 2014). Due to low reimbursement rates, physicians looking to provide psychotherapy services may be more likely to opt out of joining an insurance network. Additionally, due to shortages of psychiatrists in many areas within the U.S., there may be little incentive for them to accept insurance plans as demand for their services is sufficient even in the absence of insurance acceptance policies. Despite attempts at parity such as with the 2008 MHPAEA, these policies are of limited effect considering the large number of mental health specialists that do not accept insurance of any kind. According to primary care physicians, there is a disproportionate difficulty in obtaining mental health services compared to other commonly used services and specialists. Many physicians claim that lack of or inadequate coverage contributes significantly to this difficulty. Similarly, plan barriers and provider shortages were problematic for many physicians acting as gateways to the mental health system. Of note is that physicians having a relatively high number of Medicaid patients increased the problem of inadequate coverage even though this population was more likely to require extensive treatment for severe mental illnesses (Cunningham, 2009). Rates of Medicaid acceptance amongst facilities offering mental health services will be addressed in this paper. Given the increased demand for mental health services induced by the Medicaid expansion program is driven by the increases in coverage under

Medicaid plans, facility acceptance rates will be integral to determining the potential benefits of the program for beneficiaries with mental health needs.

Many studies have considered the accessibility of mental health services by looking into the effects of having insurance on the likelihood of obtaining appropriate care. One study showed that persons enrolled in Medicaid or private plans have significantly higher levels of access to mental health, alcohol, and drug abuse care compared to uninsured populations. High levels of unmet need and delays in care were most frequently observed for the uninsured population. However, even Medicaid beneficiaries faced substantial levels of unmet need although their access to and satisfaction from mental health care services were higher than that of the uninsured sample. These results suggest a need for supply-side interventions within Medicaid, such as increased reimbursement rates to encourage network participation amongst mental health providers (Wells, 2002). Another paper looking at the potential benefits of the ACA Medicaid Expansion program focused on the low-income uninsured adult population with chronic health conditions. For uninsured individuals, their "health care safety net" (which consists mostly of community-based clinics and emergency departments) is vastly improved upon by enrollment in the Medicaid program. This study again found that Medicaid-insured adults had better access, higher use, and higher spending than their uninsured counterparts. Furthermore, they face lower levels of out-of-pocket spending. The increases in total healthcare spending were even more significant for adults with mental health conditions. Medicaid enrollment increases the likelihood that beneficiaries have a usual source of care outside the emergency department and is predicted to significantly increase utilization of a wide range of services including inpatient stays, outpatient/office visits, and prescription drugs (Clemans-Cope, 2013). The relationship between obtaining Medicaid coverage and mental health care utilization is important to this analysis as any changes in accessibility as a result of the expansion program become especially relevant for new beneficiaries since it has been shown that Medicaid coverage predicts increases in the demand for these services. Utilization of mental health services among Medicaid enrollees has been shown to be comparable to or even exceed utilization among those with private

insurance. Being enrolled in Medicaid makes it more likely that an individual receives treatment for a mental health disorder compared to those without insurance or those with private insurance.[3]

Several other studies have considered the relationship between mental health care accessibility and geographic proximity to relevant services and facilities with mixed results. One early study examined the value of using distance as a variable to explain utilization and effectiveness of mental health facilities. The effect of distance to treatment facilities on readmission rates was analyzed but no differences in this outcome variable were found between patients living in more distant rural areas and those living in the city center (Smith, 1976). Following the finding that 60% of U.S. counties do not have a practicing psychiatrist, another paper uses Florida as an example of a low performing state as defined by the per capita number of available mental health resources. By calculating accessibility scores for each census population block, this study identified areas with poor accessibility to these services. Many of these regions were found in rural areas, suggesting the presence of completely inaccessible areas and a generally uneven distribution of health care facilities (Ghorbanzadeh, 2020). Another similar study suggests the importance of facility location in determining potential accessibility and utilization. The researchers find mental health care facilities to be unevenly distributed in Montreal, with a concentration of resources in downtown areas and business districts (Ngui, 2012). One final study considers the Medicaid mental health care infrastructure specifically. This is important considering that Medicaid is the largest payer of mental health care in the U.S. and serves groups with relatively high rates of severe mental disorders. The potential benefits of Medicaid Expansion are limited by the fact that a majority of counties have been identified as partial or whole Mental Health Professional Shortage Areas, as well as by the low rates of Medicaid participation amongst mental health facilities and office-based psychiatrists. This paper investigates the relationship between mental health outpatient facility accessibility and community characteristics of a given area. Results show that communities with high rates of racial

[3] "Facilitating Access to Mental Health Services: A Look at Medicaid, Private Insurance, and the Uninsured," *KFF*, November 27, 2017, https://www.kff.org/medicaid/fact-sheet/facilitating-access-to-mental-health-services-a-look-at-medicaid-private-insurance-and-the-uninsured/.

minorities and rural areas were more likely to be identified as areas with poor access to Medicaid-accepting facilities. Given the anticipated increase in demand for mental health services following Medicaid Expansion enactment, these researchers suggest policies which may improve access to these facilities. Among suggestions included in the paper are policies designed to increase Medicaid network participation amongst outpatient mental health providers and increase the capacity of primary care facilities to provide specialty services to Medicaid enrollees (Cummings, 2013).

Although other papers have examined the geographical accessibility of mental health services in the U.S., the use of several yearly SAMHSA directories of facilities is a novel contribution and may reveal patterns in accessibility across the U.S. The SAMHSA directories allow for a broad analysis of accessibility across the U.S. as the data contains information on both private and public facilities across all fifty states. Furthermore, this paper aims to develop a more explicit relationship between the Medicaid expansion program and the availability of mental health services. As other papers have suggested, the low rates of Medicaid acceptance by mental health professionals and the high number of mental health shortage areas present potential barriers to the benefits of the expansion program despite the significant increases in Medicaid coverage. This paper will attempt to determine whether the expansion program actually leads to significant improvements in the accessibility of mental health services. It is possible that the barriers mentioned above prevent the program from effectively improving access to psychiatric facilities, especially considering the growing importance of primary care settings in the provision of these services.[4] The role of primary care physicians in the provision of behavioral health services is especially important in rural areas, as they are generally more accessible with regards to geographic distribution. The increasing reliance on primary care settings to provide mental health care and the expanding role of psychiatric assessment and treatment in primary care practices may reduce the potential effect of the expansion program on the geographical accessibility of facilities that are primarily intended for the

[4] "Behavioral Health Service Provision by Primary Care Physicians," *University of Michigan Behavioral Health Workforce Research Center*, October 2019, https://www.behavioralhealthworkforce.org/wp-content/uploads/2019/12/Y4-P10-BH-Capacityof-PC-Phys_Full.pdf.

treatment of behavioral health conditions. For example, it is hypothesized that the availability of psychiatric hospitals will be less subject to change in response to the increased demand for healthcare services as compared to general healthcare facilities which may integrate mental health services into their practices. Furthermore, potential lags in changes in the supply of mental health services may result from extensive infrastructure requirements needed to open new facilities, including medical staff, building costs, and funding opportunities. Therefore, studying trends for several years beyond the initial implementation of Medicaid Expansion may reveal delays in the effect of the program on the accessibility of facilities.

Institutional Details: Medicaid and Mental Health Services

Medicaid is the principal payer of behavioral health services in the U.S., covering 21% of adults with mental illness in 2015 and 26% of adults with serious mental illness, but only 14% of the general adult population. However, coverage of behavioral health services under Medicaid varies significantly among states. Medicaid is mandated to cover certain mental health services in all states including necessary inpatient hospital services, outpatient services, and rural health clinic services. To supplement this, states may elect to cover other optional services including prescription medications, rehabilitation services, and clinical social work services. Following Medicaid Expansion, states were required to offer alternative benefit plans (ABPs) to newly eligible beneficiaries. Unlike the traditional Medicaid fee-for-service (FFS) package, these plans include a minimum set of behavioral health benefits to be offered at parity with physical health benefits. States use a combination of FFS and managed care arrangements to provide behavioral health services, with many states shifting towards managed care systems since the ACA. Some states have "carve out" policies for behavioral health services, in which they are not included in the managed care plan but instead financed on an FFS basis or under a prepaid health plan. Other states "carve in" these services into comprehensive contracts with physical health services.[5]

[5] Julia Zur, MaryBeth Musmeci, and Rachel Garfield, "Medicaid's Role in Financing Behavioral Health Services for Low-Income Individuals," Kaiser Family Foundation, June 2017, http://files.kff.org/attachment/Issue-Brief-Medicaids-Role-in-Financing-Behavioral-Health-Services-for-Low-Income-Individuals.

It has been demonstrated that Medicaid has a positive impact on the likelihood that an individual receives treatment. The receipt of psychiatric medications is more common among Medicaid enrollees than those with private insurance. Compared to those without coverage, the availability of Medicaid decreases the likelihood of having an unmet need for behavioral health care.[6] However, those with mental illnesses tend to be far more expensive than those without such disorders; Medicaid pays almost four times as much for these patients as a result of frequent comorbid conditions and overall increased service use. In 2014, Medicaid was responsible for 25% of spending on mental health services, with spending levels increasing following the ACA's Medicaid Expansion policy.[7]

Depending on the state, Medicaid reimbursement follows a fee-for-service or managed care arrangement. The FFS system provides a specific reimbursement for each service and pays doctors only for the specific care received.[8] However, the reimbursement rates are not as beneficial to providers as working with patients with private insurance. The FFS system also encourages the provision of potentially wasteful services, and this might induce higher levels of demand for services in states utilizing this payment scheme. The managed care model has become more popular since the passage of the ACA as a way to manage Medicaid spending levels. With this model, Medicaid pays a set amount for each patient after evaluating the patient's condition as a whole, regardless of the services received. In this case, there is concern that providers will not supply adequate services to patients who exceed their payment.[9] The complexities of the Medicaid reimbursement process have disincentivized some providers from working with Medicaid patients. Low payment rates may be another factor which discourages more widespread Medicaid acceptance, as for many services Medicaid will only pay about 60% of what Medicare or private insurance would pay. Interestingly, federal contributions to state Medicaid programs are inversely related to state per capita income levels, such that states with lower income levels obtain

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[6] "Facilitating Access to Mental Health Services: A Look at Medicaid, Private Insurance, and the Uninsured," *KFF*, November 27, 2017, https://www.kff.org/medicaid/fact-sheet/facilitating-access-to-mental-health-services-a-look-at-medicaid-private-insurance-and-the-uninsured/.
[7] Zur, Musmeci, and Garfield, 2017.
[8] "Provider payment under fee for service," *MACPAC*, https://www.macpac.gov/subtopic/provider-payment/#:~:text=State%20Medicaid%20programs%20generally%20use,initially%20for%20the%20Medicare%20program.
[9] "Medicaid managed care payment," *MACPAC*, https://www.macpac.gov/subtopic/medicaid-managed-care-payment/.

higher federal contribution rates.[10] As a result, providers in these states can generally expect better reimbursements; looking into the state-specific contribution rates from the federal government may reveal a link between relative provider reimbursement rates and the accessibility of services. For example, if providers in a particular state receive higher Medicaid payments compared to those in another state, more of them may participate in the Medicaid program. Consequently, this may result in a higher number of new Medicaid-accepting facilities within these states when coverage is expanded under the ACA. Adequate funding to mental health professionals is needed to ensure the continued availability of these services. Another result of the ACA is that states were required to pay Medicare rates for certain primary care services when they were provided by family, general internal, or pediatric medicine physicians. Although these raised rates expired in 2014, some states continued to pay higher rates for primary care services to improve access.[11] States with this policy in place might also be more likely to have increased accessibility to mental health services provided by these primary care physicians as a result of the expansion policy.

Due to the significant amount of variation in payment systems permitted across states, the direction and magnitude of the effect of the expansion policy on geographic accessibility may differ according to the specific policies in place within any given region. Even within the FFS and managed care payment systems, there are important differences in the reimbursement process to providers for different mental health services. States have significant flexibility in determining their specific Medicaid reimbursement policies and range of covered services.[12] Depending on the specific reimbursement policies in each state, the increased demand for mental health services as a result of Medicaid Expansion may be expected to be met by providers in differing treatment settings. As a result, crowding out of

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[10] "Federal and State Share of Medicaid Spending," *KFF*, Accessed March 20, 2021, https://www.kff.org/medicaid/state-indicator/federalstate-share-of-spending/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D.

[11] Michael Ollove, "Some States Pay Doctors More to Treat Medicaid Patients," *Pew*, April 17, 2015, https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2015/4/17/some-states-pay-doctors-more-to-treat-medicaid-patients.

[12] "Behavioral health services covered under state plan authority," *MACPAC*, https://www.macpac.gov/subtopic/behavioral-health-services-covered-under-state-plan-authority/.

designated mental health facilities may occur in certain states in which reimbursement policies are more favorable to primary care physicians working within general health facilities.

There are some common barriers involved in the reimbursement of mental health services which should be mentioned here. One forum finds that reimbursement policies favor coverage of procedures over cognitive services and certain restrictions on same-day billing prevent providers from getting reimbursed for a visit that addresses both physical and behavioral concerns. This places some providers at a disadvantage for offering mental health services compared to physicians who focus primarily on procedure-based visits for physical health concerns. Furthermore, reimbursement policies fail to effectively take into account collaborative care and case management related to mental health services and do not incentivize preventative mental health services in primary care settings. Medicaid favors providers with mental health credentials when managed care organizations use carve-out systems to deliver mental health services.[13] States that utilize these carve-out networks might see a greater increase in accessibility to designated mental health facilities following Medicaid Expansion if mental health specialists are advantageously reimbursed compared to primary care physicians who might offer comparable services. All the reasons mentioned above may disincentivize primary care physicians from engaging in psychological assessments and treatments in their clinical practice. These policies may be particularly detrimental for rural populations, where qualified mental health professionals are often in shortage.

Methods

Data

Locational data on facilities offering mental health services was obtained from the Substance Abuse and Mental Health Services Administration (SAMHSA) National Directories of Mental Health Facilities. These directories are available for one pre-period year (2012) and six post-period years (2015

[13] Danna Mauch, Cori Kautz, and Shelagh Smith, "Reimbursement of Mental Health Services in Primary Care Settings," *Substance Abuse and Mental Health Services Administration*, 2008, https://store.samhsa.gov/sites/default/files/d7/priv/sma08-4324.pdf.

through 2020). These directories provide the names, addresses, and various characteristics of public and private facilities offering mental health treatment services and operating within the U.S. The directories for each year include facilities that responded to the National Mental Health Services Survey (N-MHSS) from the year before. The data is organized by state, city, and facility name. Facility characteristics include types of insurance plans accepted, primary focus, and specific services offered.

Additional data on county-level information including population characteristics and healthcare utilization is obtained from the 2018-2019 Area Health Resource Files, provided by the Health Resources & Services Administration (HRSA). These variables are provided at a county level, and the two data sources are merged through a zip-code to county crosswalk. When a zip-code does not fall entirely within one county, the county with the highest population is used to determine zip-code-level regional characteristics. Zip-level population estimates are taken from the 2016 5-year American Community Survey (ACS), which is a demographic survey program conducted by the U.S. Census Bureau.

State-level population characteristics were taken from the 2014 American Community Survey. These variables are used for regressions which consider accessibility measures at the state-level. These variables include population demographics including racial/ethnic composition, age distribution, and measures of educational attainment. (See **Table 1**). There are certain differences between the two groups of states that should be noted. Across expansion states, mean household income is generally higher than in non-expansion states ($77,349 vs. $65,394). Average minority rates across the two groups are not consistent, with generally higher rates of people identifying as Hispanic in expansion states but higher rates of African Americans being found in non-expansion states. The percentage of unemployed people at the state-level is slightly higher in expansion states but the difference is small in magnitude (5.54% vs. 5.34%). The average percentage of people in a state with income below the poverty level is also similar between the two groups, with only slightly higher levels in non-expansion states. Measures of educational attainment also do not differ significantly, with very similar rates of high school graduates. There are higher rates of college graduates in expansion states (31.01% vs. 25.97%), although the standard deviation for this measure is also larger for this group of states (7.12 vs. 2.54). Besides the potentially

significant difference in mean household income, the two groups appear to be relatively similar with regards to this group of selected state-level covariates.

Table 1. Summary statistics for state-level population characteristics

Summary Statistics	All States	Expanded	Not Expanded
Mean Household Income			
minimum	54,881.00	55,976.00	54,881.00
median (IQR)	69,271.00 (64,703.00, 79,195.00)	78,521.00 (67,589.00, 85,854.00)	65,064.00 (62,475.75, 68,318.50)
mean (sd)	73,266.88 ±± 12,603.23	77,349.33 ±± 13,455.77	65,393.57 ±± 5,025.38
maximum	104,615.00	104,615.00	73,913.00
Percent Black			
minimum	1.60	1.60	1.60
median (IQR)	9.00 (5.10, 17.00)	7.80 (4.05, 15.00)	14.95 (7.62, 26.00)
mean (sd)	12.94 ±± 11.14	10.93 ±± 10.66	16.82 ±± 11.39
maximum	50.70	50.70	37.90
Percent Hispanic			
minimum	1.30	1.30	2.80
median (IQR)	9.10 (4.60, 14.30)	9.90 (4.75, 17.25)	7.45 (4.20, 9.40)
mean (sd)	11.97 ±± 10.82	13.02 ±± 11.41	9.94 ±± 9.66
maximum	47.00	47.00	38.20
Percent Unemployed			
minimum	2.20	2.20	3.30
median (IQR)	5.60 (4.50, 6.40)	5.60 (4.75, 6.40)	5.55 (4.53, 6.38)
mean (sd)	5.47 ±± 1.18	5.54 ±± 1.21	5.34 ±± 1.16
maximum	7.60	7.60	6.70
Percent Without Insurance			
minimum	3.80	3.80	8.70
median (IQR)	12.90 (9.90, 15.80)	10.90 (8.75, 13.55)	14.85 (13.05, 17.47)
mean (sd)	12.72 ±± 4.13	11.46 ±± 3.90	15.15 ±± 3.52
maximum	21.90	20.30	21.90
Percent of People with Income Below Poverty			
minimum	8.90	8.90	11.60
median (IQR)	15.60 (12.00, 17.80)	14.20 (11.75, 16.80)	17.25 (14.55, 18.18)
mean (sd)	15.18 ±± 3.27	14.40 ±± 3.26	16.68 ±± 2.80
maximum	22.60	20.90	22.60
Percent High School Graduates			

Summary Statistics	All States	Expanded	Not Expanded
minimum	81.50	81.50	81.60
median (IQR)	88.00 (85.00, 90.20)	88.90 (85.40, 90.30)	85.95 (84.92, 89.50)
mean (sd)	87.56 ±± 3.15	88.06 ±± 2.98	86.61 ±± 3.34
maximum	92.30	92.30	92.30
Percent College Graduates			
minimum	18.70	18.70	20.40
median (IQR)	27.40 (25.60, 32.30)	31.00 (26.40, 34.80)	26.70 (24.57, 27.33)
mean (sd)	29.29 ±± 6.40	31.01 ±± 7.12	25.97 ±± 2.54
maximum	53.40	53.40	30.70

Measures

Geographic Accessibility Scores

The primary dependent variable in each section of analysis will be a measure of geographical accessibility for each designated region. Accessibility is defined in the following three ways for analysis purposes: (1) as the number of facilities offering mental health services per 10,000 people; (2) as the proportion of state population living in a zip code with at least one facility; and (3) as the proportion of state population living in a zip code with above average accessibility. For the third measure, average accessibility for each year is defined by the mean facility count per 10,000 people across all zip codes. In terms of the regional specification, state-level accessibility measures are primarily considered in this analysis. The treatment condition (whether Medicaid Expansion was implemented in 2014 or not) varies on a state-level, so accessibility at this geographic level is the primary focus of this paper. However, accessibility scores are also calculated at the zip-code-level and are used in the third measure of accessibility mentioned above.

As extensions to this analysis, changes in the accessibility of facilities with certain characteristics are also considered. For these extensions, accessibility is again defined as the number of facilities per 10,000 people in each geographic region. Facility characteristics utilized for this analysis include certain service settings (i.e.. inpatient, outpatient, and residential), facility types (i.e.. psychiatric facilities), and

forms of payment accepted (i.e.. Medicaid). These are derived from the acronym codes included in the SAMHSA directories for each year.

Independent Variables

The Medicaid Expansion status of states will operate as the primary independent variable in the analysis. Most expansion states implemented the Medicaid Expansion program in 2014, with some enacting the policy in later years. For each post-period year considered in the analysis, the states will be classified as either expansion or non-expansion states. Due to the availability of data for several post-period years, it may be possible to examine whether changes in geographical accessibility become more significant over time following Medicaid Expansion, or whether any potential effect is limited to the first couple of years after enactment. For the purposes of this analysis, any states that adopted the expansion after 2014 are excluded.

Analysis

An initial descriptive analysis is conducted to examine general trends in the geographic accessibility and distribution of mental health facilities. Using R software, heat maps of facility availability were generated according to (1) the number of facilities per zip code and (2) the number of facilities per 10,000 people in each zip code. Accessibility graphs were also created to look at trends in several variables contained within the SAMHSA directories including rates of Medicaid-acceptance at the state level as well as various measures of accessibility at the zip-code level.

For the primary regression analysis, a difference-in-difference strategy was used to study the differential effect of enacting Medicaid Expansion in 2014 between expansion and non-expansion states. Results from analyses with and without state-level covariates were considered. For the analyses that excluded these variables, measures of facility accessibility were regressed on the interaction term between the binary treatment variable and a binary variable which indicated whether the expansion program had been enacted (i.e.. Year $\geq$ 2014). The multivariate analyses incorporated population characteristics along

with the interaction term. One model was constructed for each of the three definitions of facility accessibility mentioned above.

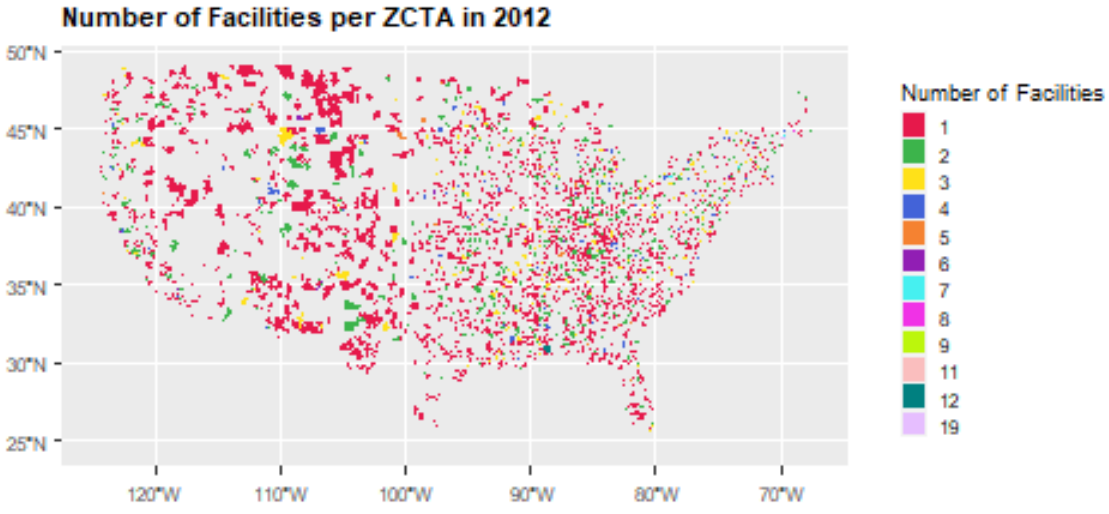
As an extension to this primary analysis, parallel regressions were run using data that was filtered according to various facility characteristics. The effect of the Medicaid Expansion program on the availability of certain types of facilities was examined through these analyses. This section examines any changes in the accessibility of facilities that (1) offer an inpatient service setting, (2) offer an outpatient service setting, (3) offer a residential service setting, (4) are designated as a psychiatric hospital or psychiatric unit of a general hospital, and (5) accept Medicaid.

Results

Initial Descriptive Analysis

Heat Maps: Geographic Availability of Mental Health Facilities

Figure 1 shows the distribution of mental health facilities across Zip Code Tabulation Areas (ZCTAs) in the U.S. in 2012, 2015, and 2020. The number of facilities is depicted. **Figure 2** shows the distribution of facilities in the same years but incorporates population estimates by presenting the number of facilities per 10,000 people.



(a)

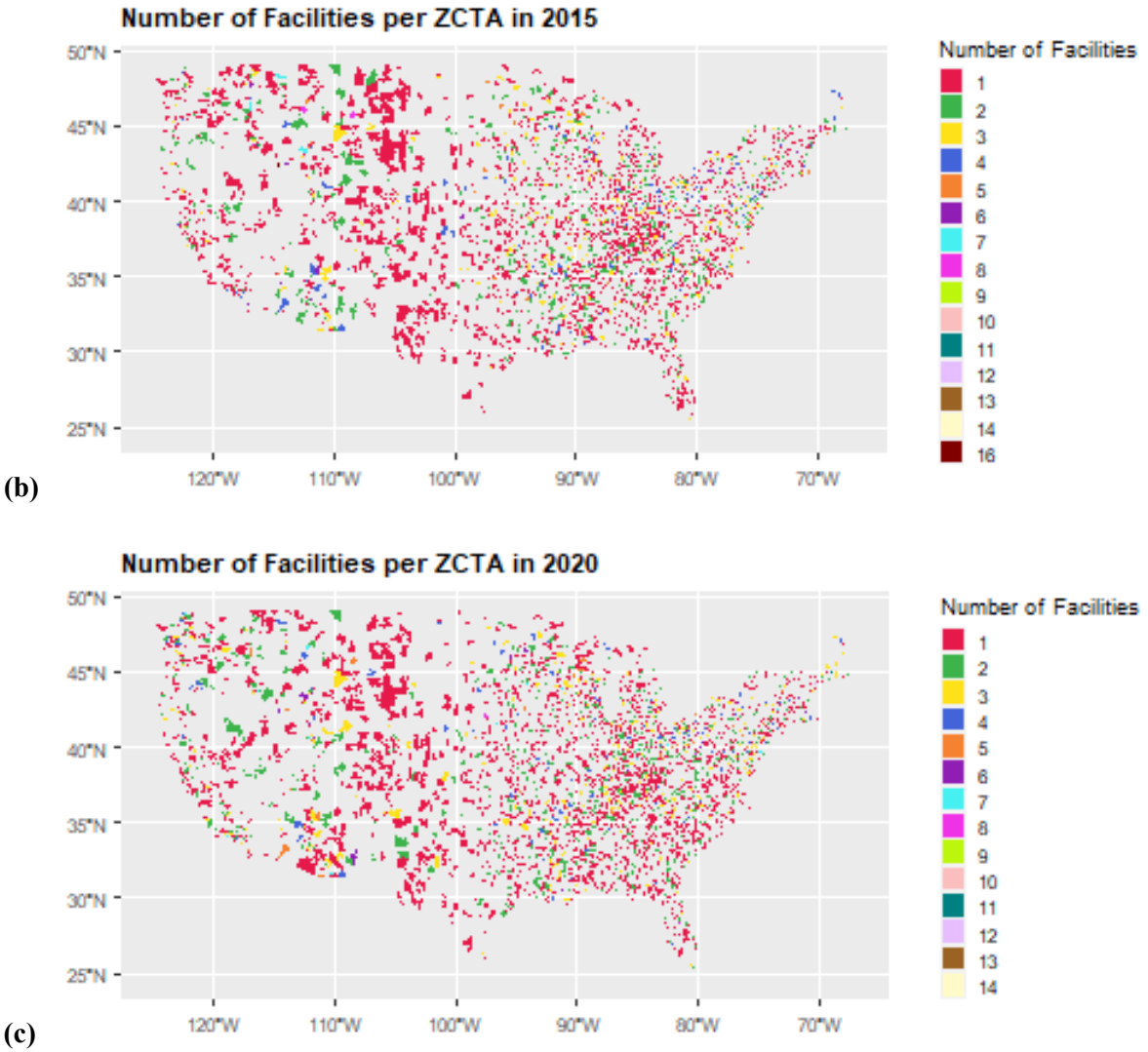
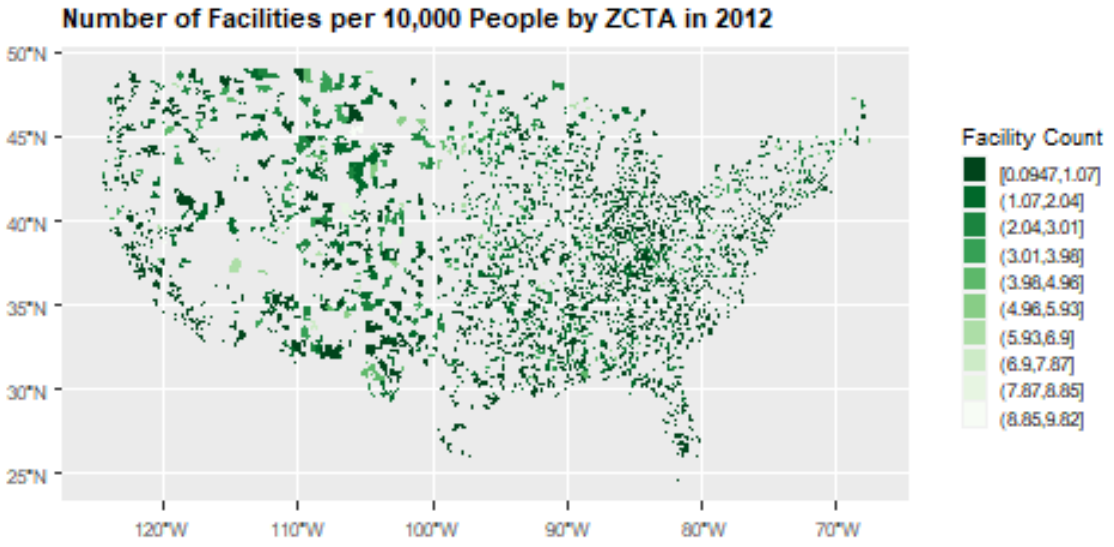
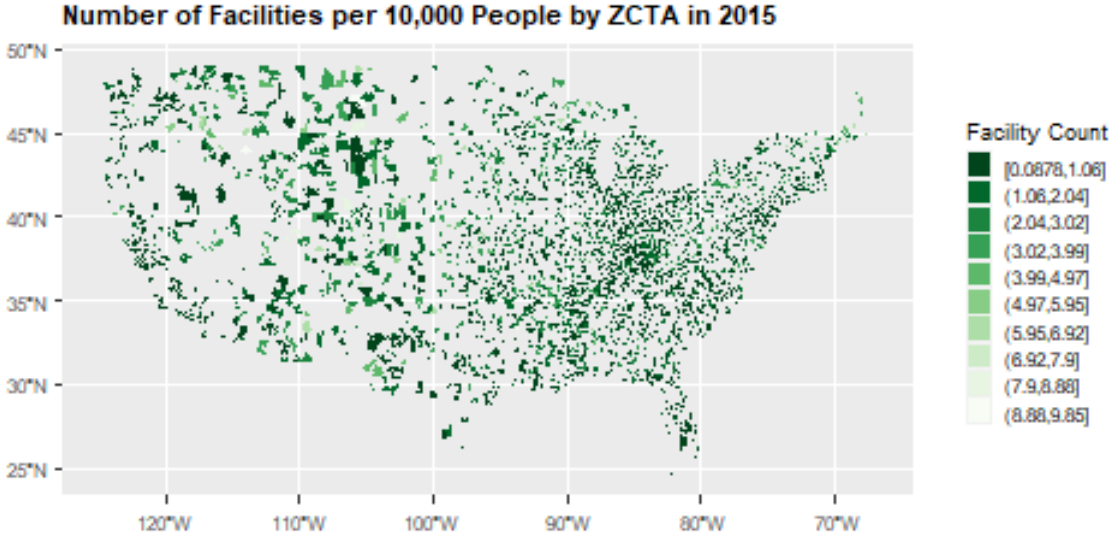


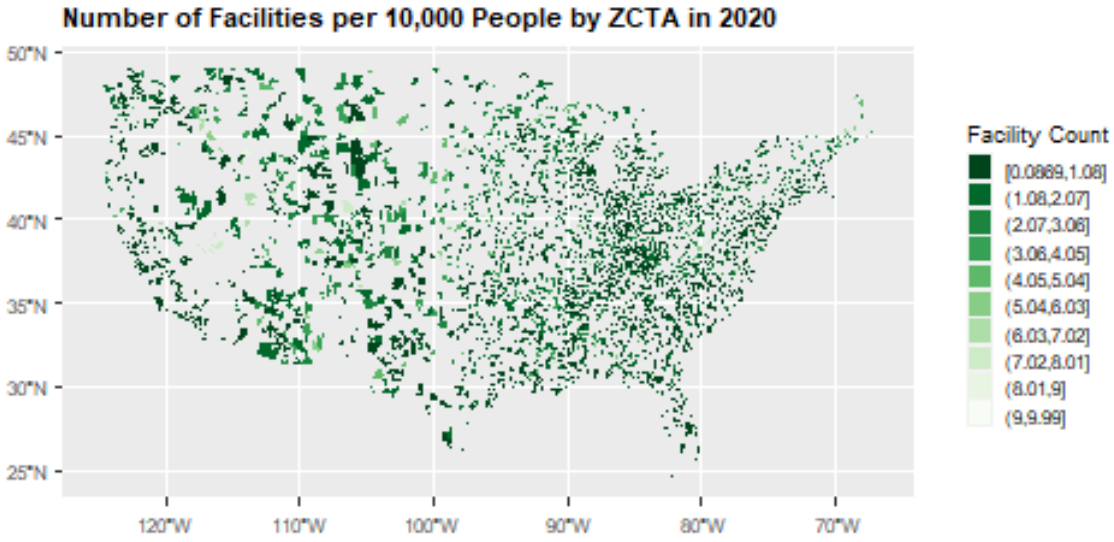
Figure 1. Distribution of the number of facilities offering mental health services across Zip Code Tabulation Areas (ZCTA) in the U.S. in (a) 2012, (b) 2015, and (c) 2020.


Number of Facilities per 10,000 People by ZCTA in 2012
50°N
45°N
40°N
35°N
30°N
25°N
120°W
110°W
100°W
90°W
80°W
70°W
Facility Count
[0.0947,1.07]
(1.07,2.04]
(2.04,3.01]
(3.01,3.98]
(3.98,4.96]
(4.96,5.93]
(5.93,6.9]
(6.9,7.87]
(7.87,8.85]
(8.85,9.82]

(a)


Number of Facilities per 10,000 People by ZCTA in 2015
50°N
45°N
40°N
35°N
30°N
25°N
120°W
110°W
100°W
90°W
80°W
70°W
Facility Count
[0.0878,1.06]
(1.06,2.04]
(2.04,3.02]
(3.02,3.99]
(3.99,4.97]
(4.97,5.95]
(5.95,6.92]
(6.92,7.9]
(7.9,8.88]
(8.88,9.85]

(b)


Number of Facilities per 10,000 People by ZCTA in 2020
50°N
45°N
40°N
35°N
30°N
25°N
120°W
110°W
100°W
90°W
80°W
70°W
Facility Count
[0.0869,1.08]
(1.08,2.07]
(2.07,3.06]
(3.06,4.05]
(4.05,5.04]
(5.04,6.03]
(6.03,7.02]
(7.02,8.01]
(8.01,9]
(9,9.99]

(c)

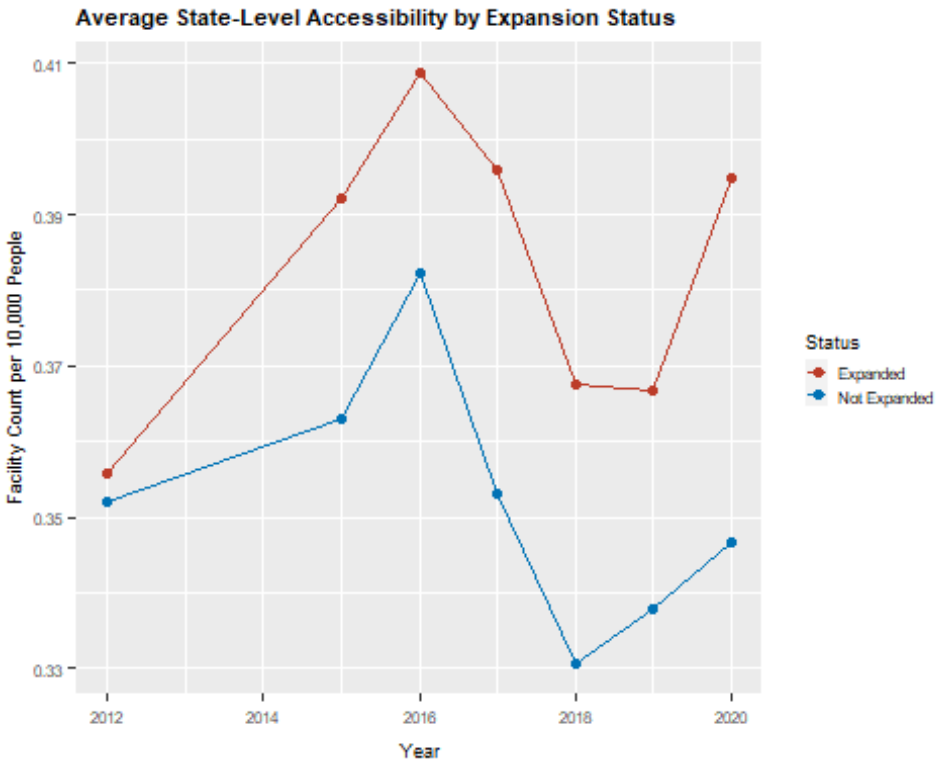
Figure 2. Distribution of the number of facilities per 10,000 people offering mental health services across Zip Code Tabulation Areas (ZCTA) in the U.S. in (a) 2012, (b) 2015, and (c) 2020.

Looking at the distribution of facilities across ZCTA, it is difficult to determine any general trends in accessibility over time although some features stand out in the maps. The maps showing the discrete number of facilities per ZCTA show that for all three years, most regions with some access have only one facility in the entire ZCTA. Furthermore, there are clearly significant gaps in the availability of facilities in all three years, with especially large areas of unshaded ZCTAs in the Western part of the U.S. Some parts of the Northeast and South are more densely shaded and have fewer large sections without any facilities, but even in these regions, accessibility is often limited to zero or one facility per ZCTA. Although it is difficult to determine any definitive trends in accessibility across the U.S. over time from these maps, they are illustrative of the generally uneven distribution of facilities and the fact that many areas in the U.S. face shortages in the availability of nearby facilities offering mental health services.

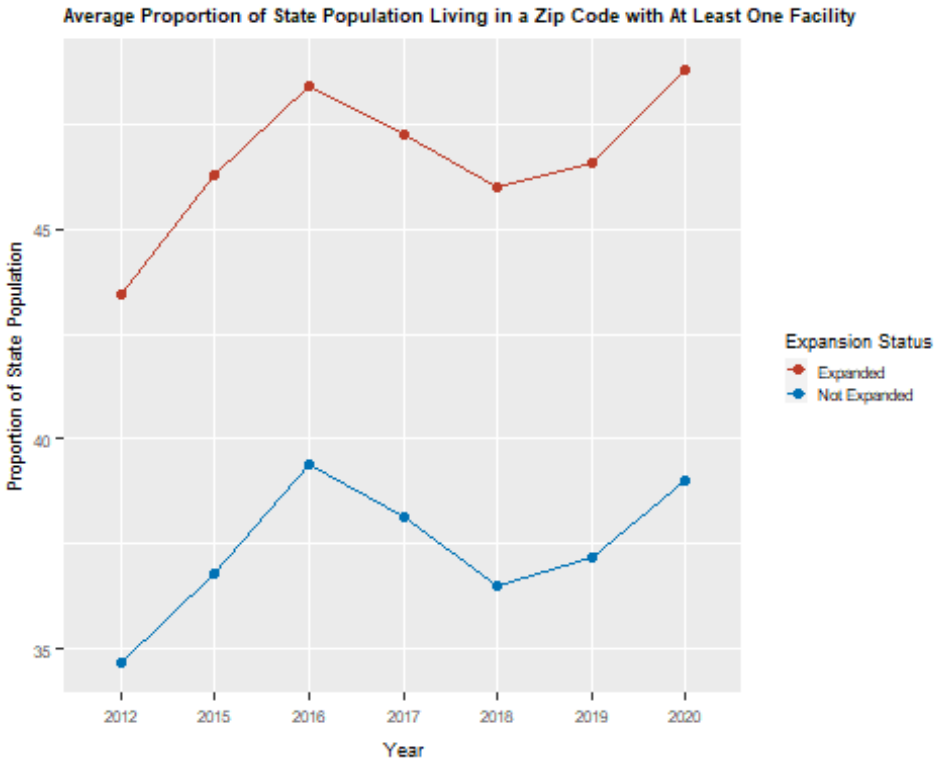
Overall Trends in the Accessibility of Mental Health Facilities

Figure 3 presents trends in state-level mental health facility accessibility for the treatment and control groups used in this analysis. Each of the graphs depicts accessibility as defined by one of the three measures mentioned above.

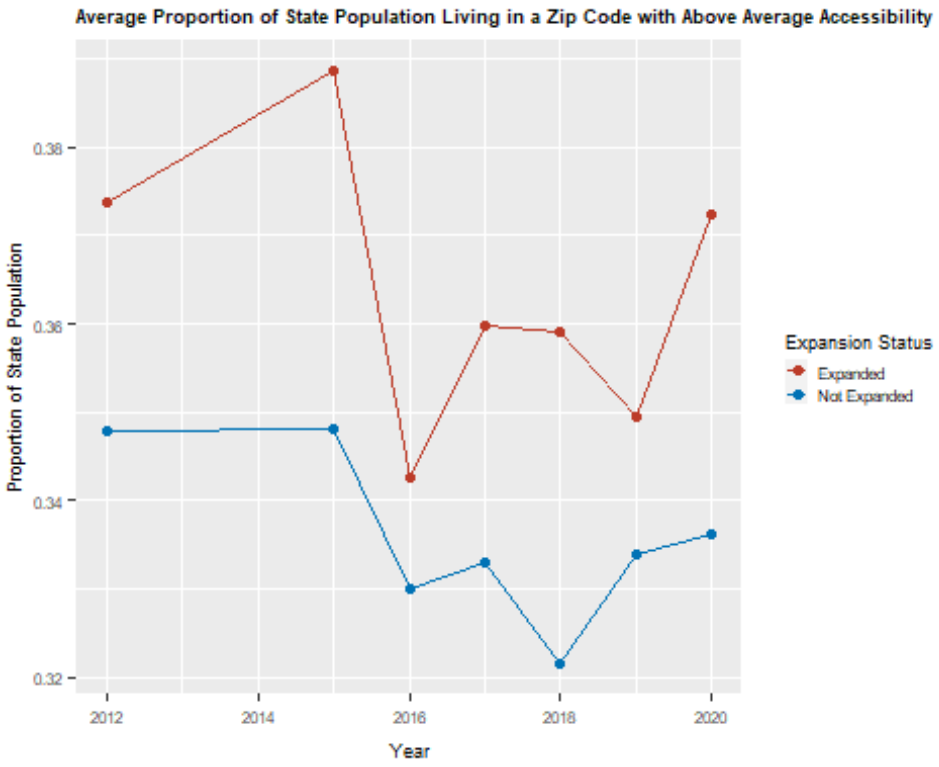
Upon initial examination, the average facility counts per 10,000 people (a) in 2012 for expansion and non-expansion states are similar, around .355. The values for this accessibility measure diverge beginning in 2015, although the trends in both groups parallel each other closely. For all years of data collected, expansion states have on-average higher levels of state-level accessibility as defined by this measure. Both groups of states have accessibility scores that peak in 2016, followed by decreases in 2017 and 2018. Accessibility in the non-expansion states increases after 2018 with the 2020 score at almost the same level as the initial score in 2012. Accessibility in the expansion states remains higher in all post-period years as compared to 2012 levels, although the initial increase in facility availability is clearly apparent for only two years after the expansion program was enacted.


Average State-Level Accessibility by Expansion Status
Facility Count per 10,000 People
0.41
0.39
0.37
0.35
0.33
2012
2014
2016
2018
2020
Year
Status
Expanded
Not Expanded

(a)


Average Proportion of State Population Living in a Zip Code with At Least One Facility
Proportion of State Population
45
40
35
2012
2015
2016
2017
2018
2019
2020
Year
Expansion Status
Expanded
Not Expanded

(b)



(c)

Figure 3. Graphs of average state-level accessibility to facilities offering mental health services according to various measures of facility availability.

When accessibility is instead defined by the average proportion of a state's population living in a zip code with at least one facility (b), there is a clear distinction between the two groups of states for all years considered in this analysis. The trends in accessibility as defined by this measure run almost exactly parallel to one another, with expansion states showing higher accessibility scores for all years considered. The initial difference in 2012 between the two groups is around 8% of the state population, with almost 35% living in a zip code with some access in non-expansion states and around 43% in expansion states. The magnitude of this difference is maintained throughout the 8-year period examined, with changes in accessibility mirrored across the two groups.

When the third measure of accessibility is used, expansion states continue to have on-average higher scores than non-expansion states for all years considered (c). The trends in accessibility in the two groups mirror each other to an extent, although there are some noticeable differences. In the first post-period year (2015), expansion states show an increase in the average proportion of a state's population

living in a zip code with above average accessibility while non-expansion states do not show a change in this measure between 2012 and 2015. However, these results are not maintained; expansion states show a decrease in this accessibility score in 2016 which goes below the initial pre-period level of accessibility. There are some more minor fluctuations between 2016 and 2020, with the access score ending around the same level as during the pre-period year of 2012. Non-expansion states show minor fluctuations throughout the 8-year period examined, with a little bit of a drop in this measure when comparing 2012 and 2020 values.

Figure 4 shows the average change in state-level accessibility by expansion status for each pair of pre- and post-period years included in the analysis. Accessibility here is defined as the number of facilities offering mental health services per 10,000 people in any given state. At first glance, expansion states show a higher average change in accessibility for each post-period year compared to 2012 levels. It should be noted that the average changes for all years are somewhat small in magnitude, with the greatest change of only 0.06 facilities per 10,000 people occurring between 2012 and 2016 for expansion states. Non-expansion states experience modest increases in this accessibility measure between the pre-period and some of the post-period years, although changes in the negative direction do occur for some post-period years (2018 and 2019).

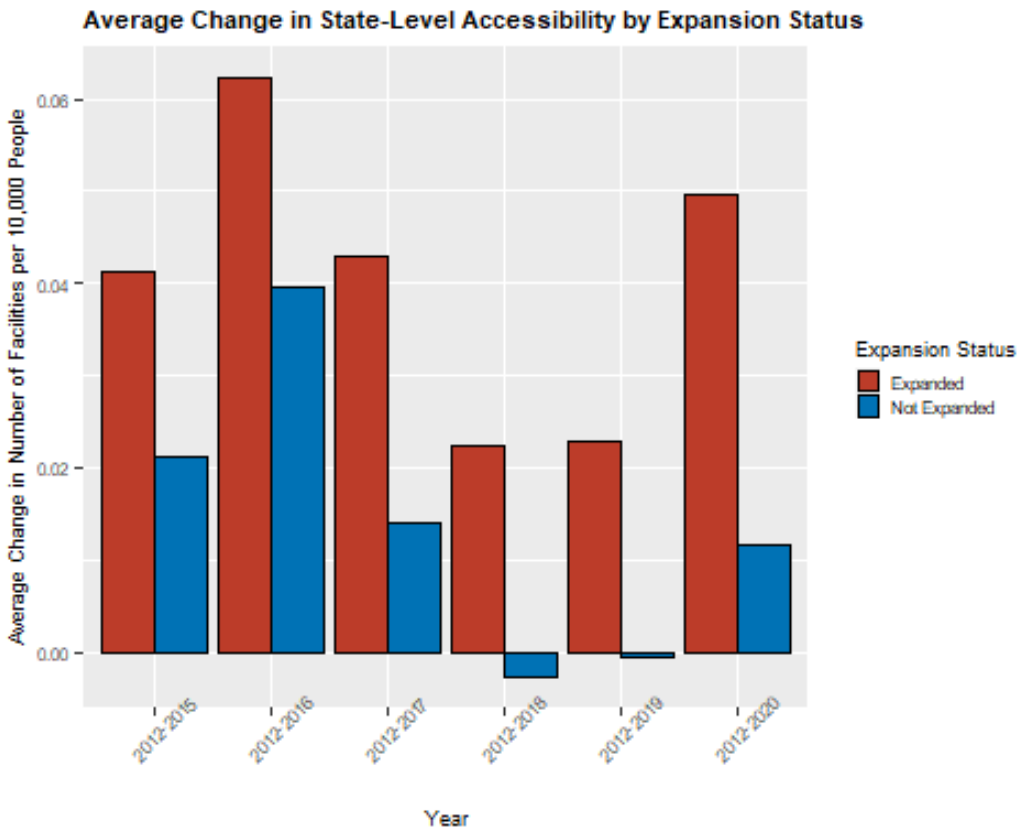
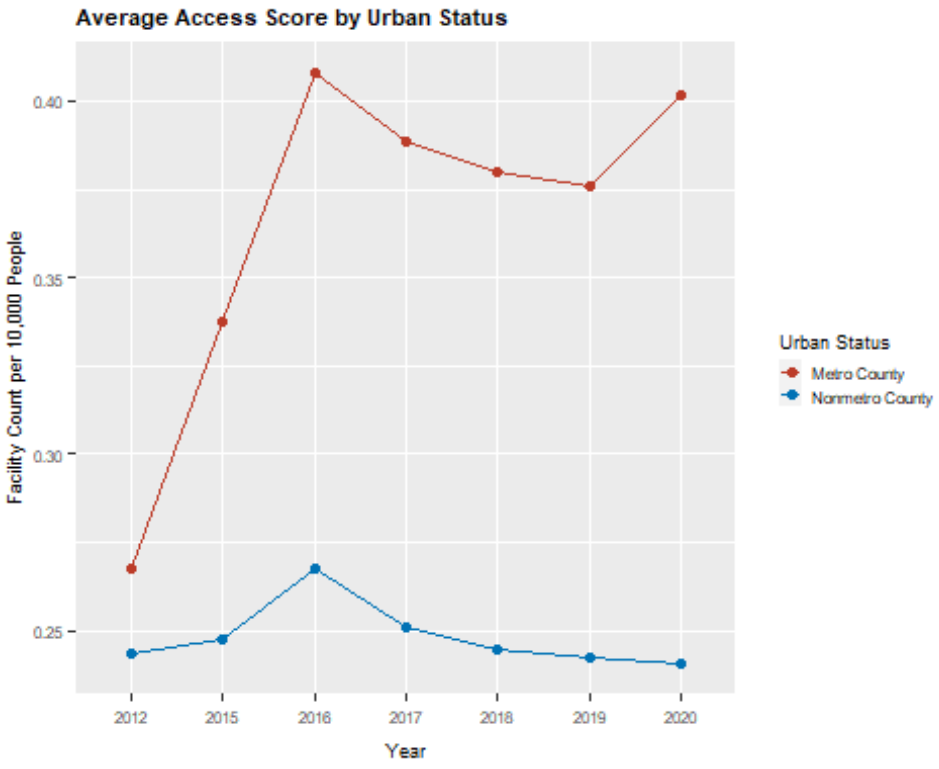


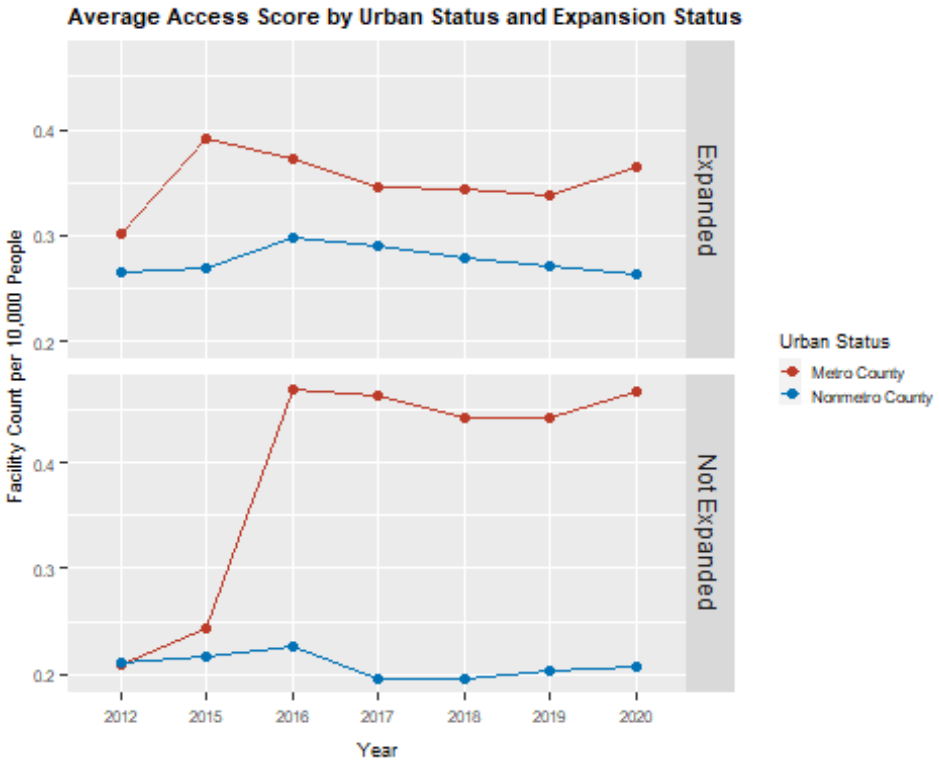
Figure 4. Bar graph of average changes across each treatment group in state-level accessibility for each post-period year relative to the pre-period (2012) measure.

Zip-Level Accessibility by Urban Status

Figure 5 examines accessibility as defined again by the number of facilities per 10,000 people. These graphs use zip-level facility counts and differentiate between metro and nonmetro counties according to the 2013 Rural-Urban Continuum Codes, which are sources from the Economic Research Service (ERS) of the U.S. Department of Agriculture. A county is defined as "metro" if it is found in a metropolitan area, which is determined with commuting criteria. "Nonmetro" counties include counties found outside of these metropolitan areas, although some may be adjacent.


Average Access Score by Urban Status
Facility Count per 10,000 People
0.40
0.35
0.30
0.25
2012
2015
2016
2017
2018
2019
2020
Year
Urban Status
Metro County
Nonmetro County

(a)


Average Access Score by Urban Status and Expansion Status
Facility Count per 10,000 People
0.4
0.3
0.2
Expanded
Not Expanded
2012
2015
2016
2017
2018
2019
2020
Year
Urban Status
Metro County
Nonmetro County

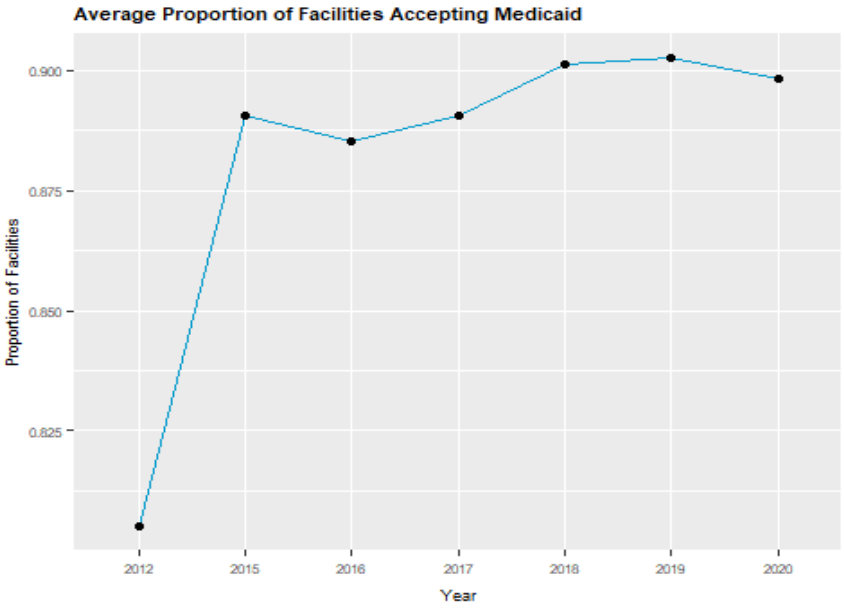
(b)

Figure 5. Trends in zip-level accessibility to mental health facilities according to whether the zip code is located within a metropolitan county.

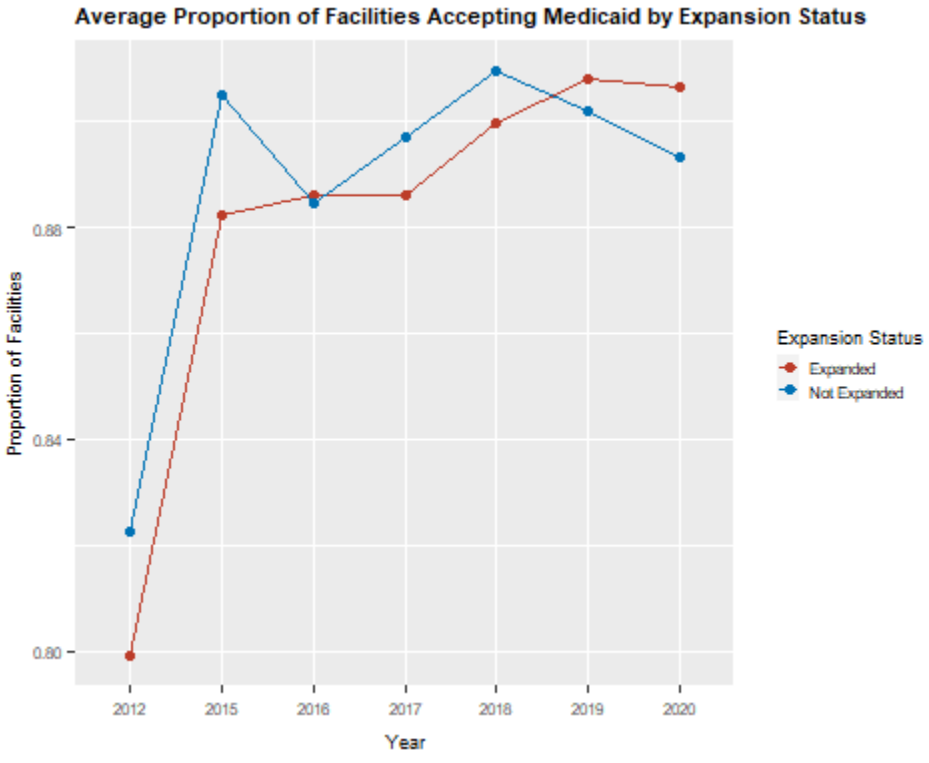
The graphs show that metro counties have higher levels of accessibility for all the years considered, although access scores increase most dramatically between 2012 and 2016 (a). Nonmetro counties show very little change in accessibility between 2012 and 2020. When the relationship between urban status and accessibility is faceted by state expansion status (b), metro counties continue to have on-average better access in both groups, although the increase in accessibility within metro counties is clearly driven by non-expansion states. Within this group of states, accessibility levels are nearly identical for both metro and nonmetro counties in 2012, but these values diverge quickly after 2015. In expansion states, accessibility in metro counties shows a slight increase following expansion in 2015, although it then decreases over the following two-year period.

Rates of Medicaid Acceptance

Figure 6 shows an increase in the proportion of mental health facilities accepting Medicaid payments after 2012 (a), and rates remain at this higher level throughout the post-period years examined. In the pre-period, about 80% of mental health facilities report accepting Medicaid, while this figure rises to 90% by 2018. Medicaid-acceptance rates increase most dramatically between 2012 and 2015 in both expansion and non-expansion states (b). Throughout all the years included in this analysis, rates of Medicaid-acceptance among mental health facilities are very similar across both groups of states.



(a)



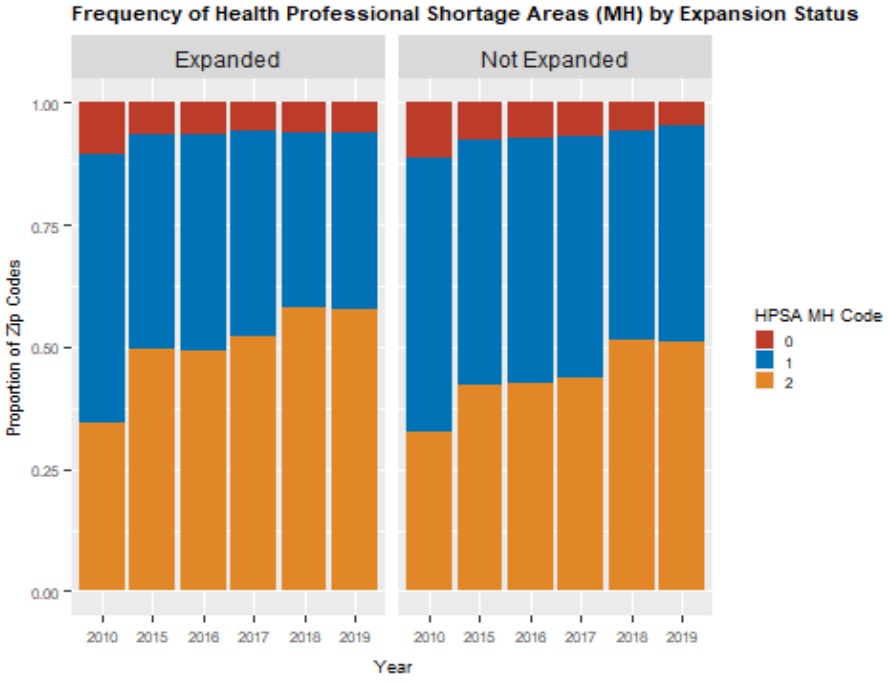
(b)

Figure 6. State-level trends in the average proportion of mental health facilities that accept Medicaid payments.

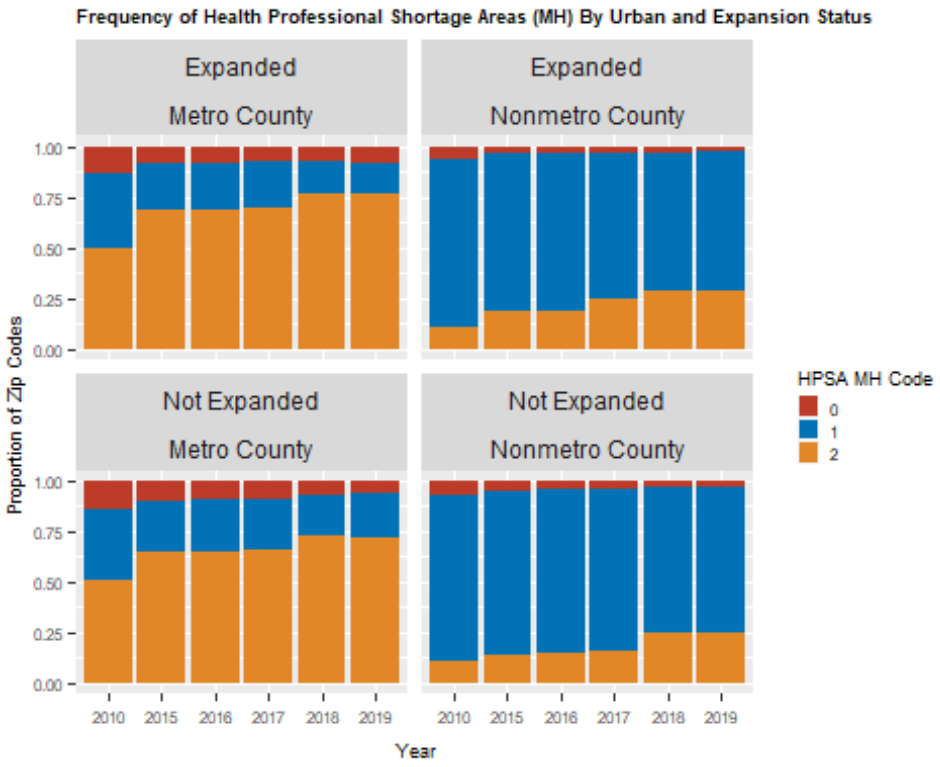
Mental Health Professional Shortage Areas

HRSA provides data on Health Professional Shortage Areas (HPSA) at the county level for primary, dental, and mental health care providers. HPSA codes are designated according to whether part

of the county is designated as a provider shortage area (2), the whole county is designated (1), or none of the county is identified as having provider shortages (0). The bar graphs in **Figure 7** shows the distribution of mental health HPSAs across the two groups of states. The proportion of zip-codes in a county with each HPSA code is represented. Expansion and non-expansion states have similarly small percentages of zip-codes within counties that are not designated as mental health shortage areas. In the pre-period (2010) analysis, both groups have very similar distributions of HPSA codes across all zip codes (a). However, in the post-period years (2015-2019), expansion states show slight improvements over the non-expansion states with overall greater increases in the proportion of zip codes within counties that are only partially designated as shortage areas. Non-expansion states during the post-period have relatively higher percentages of zip codes in counties that are entirely shortage areas for mental health providers.



(a)



(b)

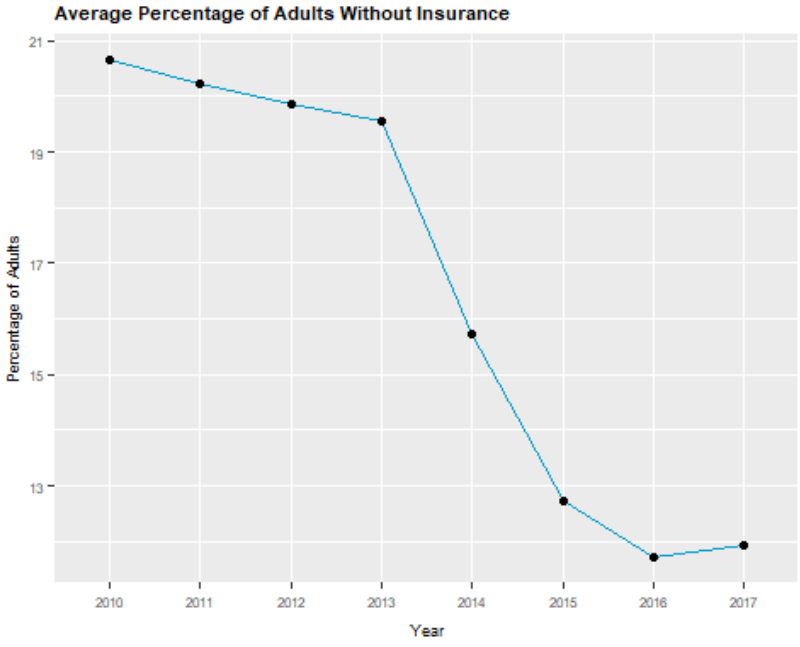
Figure 7. Trends in the distribution of zip codes according to Mental Health Professional Shortage Areas (HPSA - MH) codes.

When this analysis is further broken down according to urban status (b), the distinction between metro and nonmetro counties becomes especially clear. For both expansion and non-expansion states, zip codes in nonmetro counties are far more likely to be within a county that is entirely designated as a mental health provider shortage area. The distribution of zip codes according to HPSA codes is far more similar between expansion and non-expansion states than between metro and nonmetro counties.

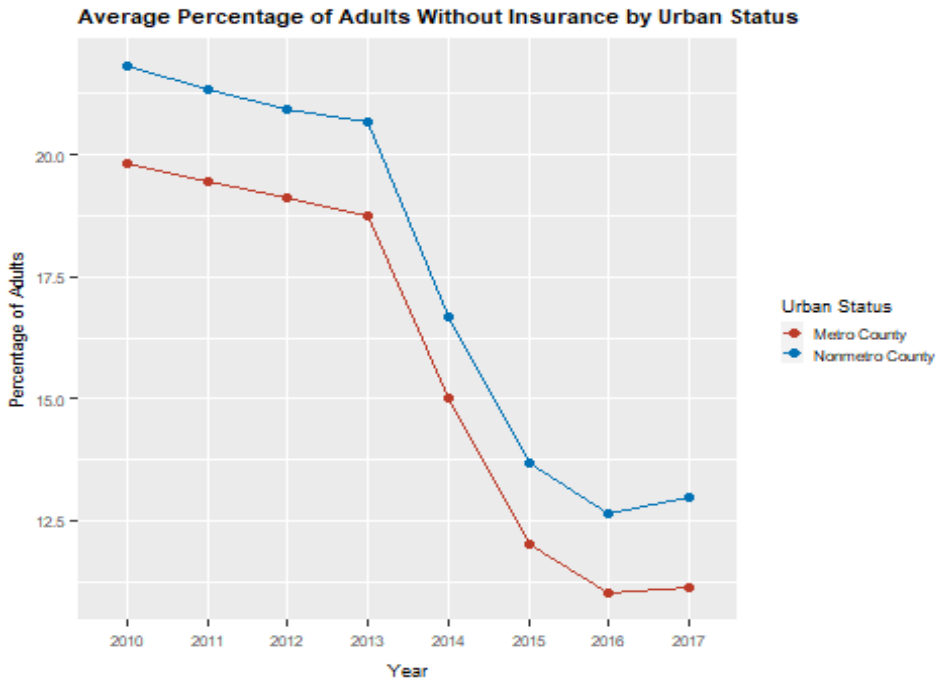
Rates of Uninsurance

The average percentage of adults without insurance coverage across zip codes is examined in **Figure 8**. Overall rates of uninsurance (a) show clear decreases following Medicaid Expansion, with the percentage of uninsured adults falling from around 19.5% to below 13% between 2013 and 2015. When average rates of uninsurance are calculated according to urban status (b), metro and nonmetro counties show parallel trends across the seven years of data, with nonmetro counties having slightly higher rates throughout. Finally, when looking at this measure across the two groups of states considered in this

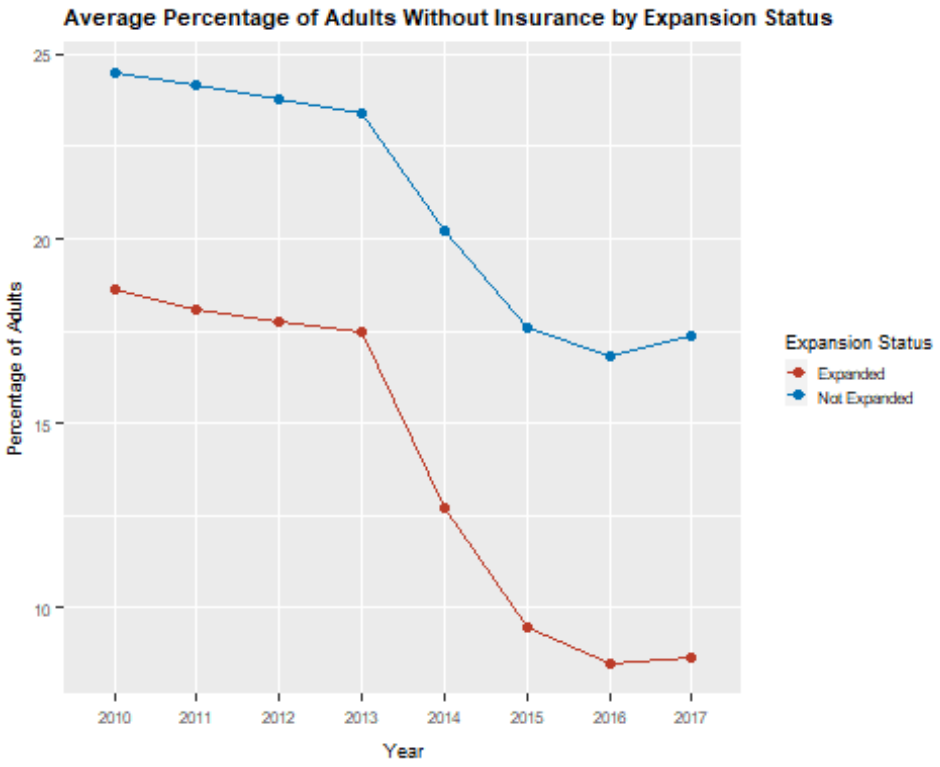
analysis (c), expansion states show lower adult uninsurance rates during both pre- and post-period years. Average uninsurance rates among zip codes are more than 5 points higher in non-expansion states than expansion states between 2010 and 2013, with this gap widening even further in the years following enactment of Medicaid Expansion. By 2017, around 17.5% of adults in zip codes of non-expansion states are uninsured compared to around 8% in expansion states.



(a)



(b)



(c)

Figure 8. Zip-level trends in the average percentage of uninsured adults.

Primary DID Analysis

The following section shows the results of the regression models utilizing a difference in difference strategy. For all regressions included in this analysis, three linear models are included. The first two OLS models are shown with both default standard errors and heteroskedasticity-robust standard errors. The *felm* results include fixed effects for both the state and year variables in an attempt to adjust for unmeasured time-invariant confounders. Because using fixed effects more effectively reduces the potential for omitted variables bias than the limited set of control variables used in the other models, the results obtained from the *felm* models will be the focus of this analysis.

Covariate Relevance

Table 2 presents the results from regressing the primary independent variable on the state-level covariates of interest.

Table 2. Regression analysis examining the association between selected state-level population characteristics and Medicaid expansion status.

State-Level Covariates	
	Dependent variable:
	Expanded
Mean Household Income	*0.0005***
	(0.0002)
Black (%)	*-0.287***
	(0.140)
Hispanic (%)	*-0.072*
	(0.090)
Unemployed (%)	*0.855**
	(0.439)
Uninsured (%)	*-0.558***
	(0.228)
Below Poverty (%)	*0.893*
	(0.595)
HS Graduate (%)	*-0.371*
	(0.428)
College Graduate (%)	*-0.297**
	(0.175)
Constant	*1.910*
	(44.282)
Observations	*41*
Log Likelihood	*-8.657*
Akaike Inf. Crit.	*35.315*
Note:	*p<0.1; p<0.05; p<0.01*

As seen from these results, some of the variables are significantly related to whether a state enacted the expansion program in 2014. Three of these variables are significant at the 5% level. Notably, having high levels of uninsurance at the state-level is related to a decreased probability that the state decided to expand Medicaid in 2014. There is a similarly negative correlation between having a higher percentage of African Americans in the population and the likelihood that a given state expanded in 2014. Finally, there is somewhat of a positive relationship indicated between state-level mean household income and the likelihood that the state is an expansion state in this sample. However, the coefficient on this covariate is very small in magnitude (0.0005), indicating that the two treatment groups are not likely to differ significantly with regards to this measure.

Regression Analysis without Covariates

Table 3 shows the results of the regression of state-level accessibility scores on the difference-in-difference estimator without controlling for covariates. Accessibility here is defined as the number of facilities offering mental health services per 10,000 people in a state. The coefficient on the DID estimator suggests an average change of 0.032 in this accessibility measure as a result of enacting the Medicaid expansion program. This effect was significant at the 10% level in the model including fixed effects but insignificant in the framework excluding the fixed effects with both default and robust standard errors. The F-statistics for these OLS models are statistically insignificant, indicating that this model does not improve upon the unconditional mean model. This lack of significance is also reflected in the low R-squared values, suggesting very limited explanatory power from using the DID estimator alone.

Table 3. Regression analysis examining the association between state expansion status and the availability of facilities offering mental health services.

DID Regressions without Covariates			
	Dependent variable:		
	Access Score		
	felm	*OLS*	
		Default SE	*Robust SE*
	(1)	*(2)*	*(3)*
Post		*0.0002*	*0.0002*
		(0.048)	*(0.061)*
Expanded		*0.004*	*0.004*
		(0.055)	*(0.064)*
*Post*Expanded*	*0.032**	*0.032*	*0.032*
	(0.016)	*(0.059)*	*(0.068)*
Constant		*0.352****	*0.352****
		(0.044)	*(0.057)*
Observations	*287*	*287*	*287*
R2	*0.935*	*0.011*	*0.011*
Adjusted R2	*0.922*	*0.0004*	*0.0004*
Residual Std. Error	*0.046 (df = 239)*	*0.166 (df = 283)*	*0.166 (df = 283)*
F Statistic (df = 3; 283)		*1.034*	*1.034*
Note:			*p<0.1; p<0.05; p<0.01*

Regression Analysis with Covariates

The regression models in the following three result tables include state-level covariates. Each of the tables defines mental health facility accessibility with a different measure, as such:

Table 4 again defines accessibility as the number of facilities per 10,000 people in a state. Using this measure, the coefficient on the DID estimator again suggests an average treatment effect of 0.032. This result is significant in the model including fixed effects but once again insignificant at the 10% level for the other two OLS specifications. Including the state-level covariates in the model improves its explanatory power, as seen by the increased R-squared values (0.357 [unadjusted], 0.331 [adjusted]). The F-Statistic for this OLS model is significant at the 1% level, indicating an improvement upon the unconditional mean model. Some of the coefficients for the included covariates are found to be significant for this accessibility measure. For example, having higher minority rates at the state level is found to predict modest decreases in the number of facilities per 10,000 people. Similarly, having higher rates of unemployment and uninsurance is related to lower state accessibility scores.

Table 5 defines the dependent variable (Access Score) as the percentage of a state's population living in a zip code with at least one mental health facility. The coefficient on the estimator suggests a treatment effect of 1.531 percentage points. This result aligns with the expectation that a state's decision to implement the expansion program would increase accessibility to mental health services. However, this result is not significant even at the 10% level when fixed effects are included in the model specification. Having higher rates of uninsurance is also related to worse outcomes with this definition of accessibility; an increase of 1 percentage point in uninsurance rates results in an estimated decrease in the percentage of a state's population living in a zip code with at least one facility by 1.145 percentage points.

Table 6 presents the third and final accessibility measure, defined by the percentage of a state's population living in a zip code with above average accessibility. Above average accessibility is determined by finding the average number of facilities per 10,000 people for each year across all zip codes included in this analysis. If the zip code of interest has more facilities per 10,000 people than the mean value in a particular year, it is designated as having above average accessibility for that year. This DID estimation examines the effect of the treatment (i.e.. expanding Medicaid in 2014) on the percentage of a state's population living in a zip code with this designation. Again, the coefficient on the estimator suggests a positive treatment effect on this measure of accessibility (0.238). However, this coefficient

estimation is again determined to be insignificant at the 10% level in the model including fixed effects. Of note is that having higher rates of uninsurance is again related to worse accessibility outcomes when this measure is used.

Table 4. Multivariate regression analysis examining the association between state expansion status and the availability of facilities offering mental health services.

DID Regressions with Covariates			
	Dependent variable:		
	Access Score		
	felm	*OLS*	
		Default SE	*Robust SE*
	(1)	*(2)*	*(3)*
Post		*0.0002*	*0.0002*
		(0.039)	*(0.047)*
Expanded		*-0.013*	*-0.013*
		(0.048)	*(0.056)*
Mean Household Income		*-0.00000*	*-0.00000*
		(0.00000)	*(0.00000)*
Black (%)		*-0.003***	*-0.003****
		(0.002)	*(0.001)*
Hispanic (%)		*-0.004***	*-0.004****
		(0.002)	*(0.001)*
Unemployed (%)		*-0.038****	*-0.038****
		(0.010)	*(0.010)*
Uninsured (%)		*-0.011****	*-0.011****
		(0.004)	*(0.004)*
Below Poverty (%)		*0.018***	*0.018**
		(0.008)	*(0.009)*
HS Graduate (%)		*0.004*	*0.004*
		(0.006)	*(0.009)*
College Graduate (%)		*0.003*	*0.003*
		(0.004)	*(0.007)*
*Post*Expanded*	*0.032**	*0.032*	*0.032*
	(0.016)	*(0.048)*	*(0.055)*
Constant		*0.074*	*0.074*
		(0.681)	*(0.963)*
Observations	*287*	*287*	*287*
R2	*0.935*	*0.357*	*0.357*
Adjusted R2	*0.922*	*0.331*	*0.331*
Residual Std. Error	*0.046 (df = 239)*	*0.135 (df = 275)*	*0.135 (df = 275)*
F Statistic (df = 11; 275)		*13.865****	*13.865****
Note:			*p<0.1; p<0.05; p<0.01*

Note: Access scores are defined by the number of facilities per 10,000 people in a state.

Table 5. Multivariate regression analysis examining the association between state expansion status and the availability of facilities offering mental health services.

DID Regressions with Covariates			
	Dependent variable:		
	Access Score		
	felm	*OLS*	
		Default SE	*Robust SE*
	(1)	*(2)*	*(3)*
Post		*2.980*	*2.980*
		(2.290)	*(2.128)*
Expanded		*0.263*	*0.263*
		(2.794)	*(2.491)*
Mean Household Income		*0.001****	*0.001****
		(0.0001)	*(0.0002)*
Black (%)		*0.030*	*0.030*
		(0.088)	*(0.074)*
Hispanic (%)		*-0.036*	*-0.036*
		(0.094)	*(0.093)*
Unemployed (%)		*-0.506*	*-0.506*
		(0.600)	*(0.592)*
Uninsured (%)		*-1.145****	*-1.145****
		(0.255)	*(0.273)*
Below Poverty (%)		*4.848****	*4.848****
		(0.459)	*(0.479)*
HS Graduate (%)		*2.766****	*2.766****
		(0.367)	*(0.523)*
College Graduate (%)		*-1.255****	*-1.255****
		(0.228)	*(0.272)*
*Post*Expanded*	*1.531*	*1.531*	*1.531*
	(1.229)	*(2.822)*	*(2.554)*
Constant		*-308.631****	*-308.631****
		(39.875)	*(54.872)*
Observations	*287*	*287*	*287*
R2	*0.920*	*0.513*	*0.513*
Adjusted R2	*0.904*	*0.493*	*0.493*
Residual Std. Error	*3.456 (df = 239)*	*7.932 (df = 275)*	*7.932 (df = 275)*
F Statistic (df = 11; 275)		*26.316****	*26.316****
Note:			*p<0.1; p<0.05; p<0.01*

Note: Access scores are defined by the percentage of a state's population living in a zip code with at least one facility offering mental health services.

Table 6. Multivariate regression analysis examining the association between state expansion status and the availability of facilities offering mental health services.

DID Regressions with Covariates			
	Dependent variable:		
	Access Score		
	felm	*OLS*	
		Default SE	*Robust SE*
	(1)	*(2)*	*(3)*
Post		*-1.401*	*-1.401*
		(2.753)	*(2.320)*
Expanded		*-0.874*	*-0.874*
		(3.359)	*(2.818)*
Mean Household Income		*0.001****	*0.001****
		(0.0002)	*(0.0002)*
Black (%)		*-0.093*	*-0.093*
		(0.106)	*(0.081)*
Hispanic (%)		*-0.292***	*-0.292****
		(0.113)	*(0.090)*
Unemployed (%)		*-1.609***	*-1.609***
		(0.721)	*(0.654)*
Uninsured (%)		*-1.017****	*-1.017****
		(0.307)	*(0.307)*
Below Poverty (%)		*4.103****	*4.103****
		(0.551)	*(0.701)*
HS Graduate (%)		*2.212****	*2.212****
		(0.441)	*(0.660)*
College Graduate (%)		*-0.721****	*-0.721**
		(0.275)	*(0.379)*
*Post*Expanded*	*0.238*	*0.238*	*0.238*
	(1.602)	*(3.393)*	*(2.915)*
Constant		*-233.500****	*-233.500****
		(47.945)	*(72.288)*
Observations	*287*	*287*	*287*
R2	*0.882*	*0.391*	*0.391*
Adjusted R2	*0.859*	*0.367*	*0.367*
Residual Std. Error	*4.503 (df = 239)*	*9.538 (df = 275)*	*9.538 (df = 275)*
F Statistic (df = 11; 275)		*16.059****	*16.059****
Note:			*p<0.1; p<0.05; p<0.01*

Note: Access scores are defined by the percentage of a state's population living in a zip code with above average accessibility. Average accessibility is determined across all zip codes in the sample for each year included in the analysis.

Extensions and Heterogeneities

The following section examines any potential heterogeneities in the effect of the expansion program on state-level accessibility to facilities offering mental health services. The samples for each of the following five regressions filter the facilities for a given characteristics to consider whether there are differential effects of the program across different types of facilities. Accessibility throughout this section is defined as the number of facilities per 10,000 people in a state.

Effects of Medicaid Expansion on the Accessibility of Inpatient Facilities

Figure 9 visualizes the average change in the accessibility of facilities designated as offering services in an inpatient setting. The average change in accessibility score across states in both groups is calculated for each pair of pre- and post-period years. The average change in the accessibility of inpatient facilities is positive only for expansion states when considering the post-period years 2016 and 2017. This implies that accessibility during these two years was higher than the initial pre-period (2012) level. However, the net changes for both these years are very small in magnitude, with the maximum value of around 0.007 occurring in 2016. This suggests an average increase of only .007 facilities per 10,000 people or .7 facilities for every 1 million people. This effect is not maintained throughout the post-period, with average accessibility dropping below initial 2012 levels for expansion states between 2018 and 2020. This aligns with recent changes in the typical structure of mental health care delivery, as inpatient services have become an increasingly smaller proportion of mental health services. Non-expansion states show a net decrease in the accessibility of inpatient facilities for all post-period years examined.

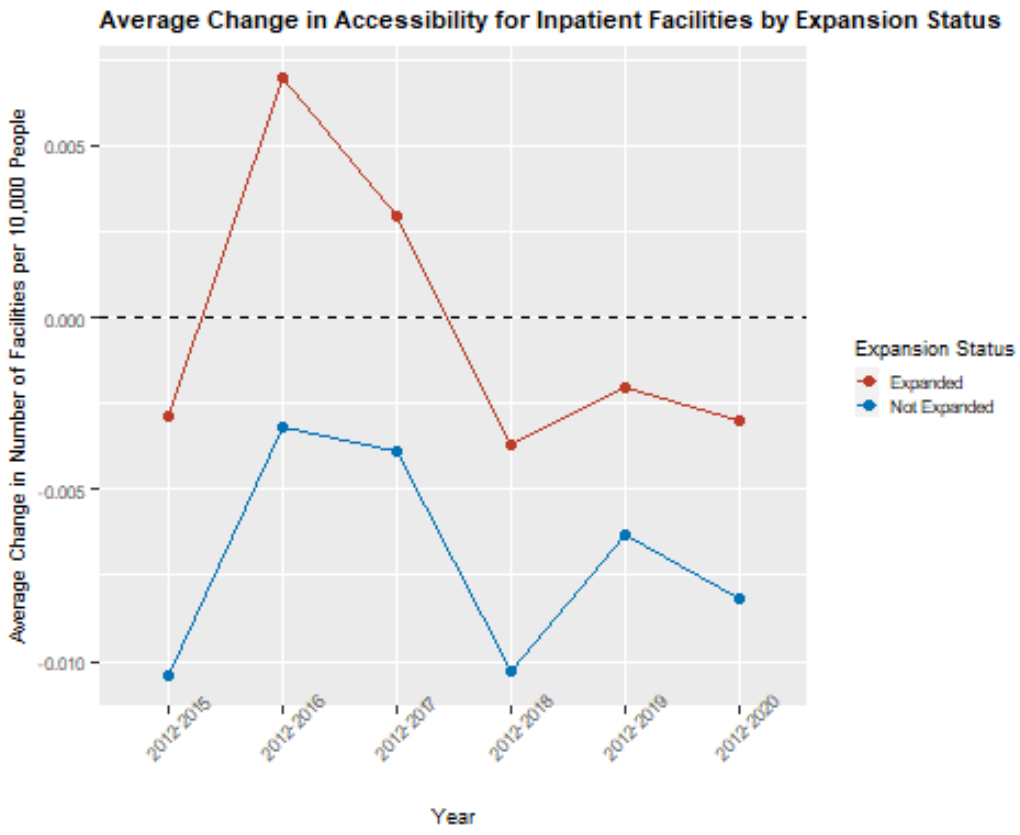


Figure 9. Average state-level changes in the accessibility of facilities offering mental health treatment within an inpatient service setting relative to pre-period (2012) levels.

Table 7 shows the results of the regression of inpatient accessibility scores on state-level covariates and the treatment variable (interaction term between the binary indicator variables *Post* and *Expanded*). The coefficient on this DID estimator suggests a treatment effect of 0.007, although this result is only determined to be significant at the 10% level in the specification including fixed effects. Regardless of statistical significance, the small magnitude of this estimate brings into question the presence of any relevant relationship between the implementation of the expansion program and the accessibility of inpatient facilities.

Table 7. Multivariate regression analysis examining the association between state expansion status and the availability of facilities offering mental health services within an inpatient service setting.

Accessibility of Inpatient Facilities		
	Dependent variable:	
	Access Score	
	felm	*OLS*
	(1)	*(2)*
Post		*-0.007*
		(0.006)
Expanded		*-0.003*
		(0.007)
Mean Household Income		*0.00000****
		(0.00000)
Black (%)		*0.0003*
		(0.0002)
Hispanic (%)		*-0.001****
		(0.0002)
Unemployed (%)		*-0.009****
		(0.001)
Uninsured (%)		*-0.001*
		(0.001)
Below Poverty (%)		*0.007****
		(0.001)
HS Graduate (%)		*0.004****
		(0.001)
College Graduate (%)		*-0.003****
		(0.001)
*Post*Expanded*	*0.007**	*0.007*
	(0.003)	*(0.007)*
Constant		*-0.340****
		(0.098)
Observations	*287*	*287*
R2	*0.868*	*0.398*
Adjusted R2	*0.842*	*0.374*
Residual Std. Error	*0.010 (df = 239)*	*0.020 (df = 275)*
F Statistic		*16.513*** (df = 11; 275)*
Note:		*p<0.1; p<0.05; p<0.01*

Effects of Medicaid Expansion on the Accessibility of Outpatient Facilities

Figure 10 shows the average change in accessibility for facilities offering outpatient services for each of the post-period years considered in this analysis. In contrast to the results observed for inpatient

facilities, the average accessibility of outpatient services in expansion states is higher in all post-period years relative to the pre-period level. The magnitude of these changes is also greater, with averages between 0.03 and 0.06 for all post-period years. Non-expansion states do not show any significant or lasting increases in average accessibility of outpatient services, with the measure hovering around initial 2012 levels during all post-period years. By 2020, average accessibility for outpatient services in non-expansion states is essentially unchanged relative to the 2012 accessibility level.

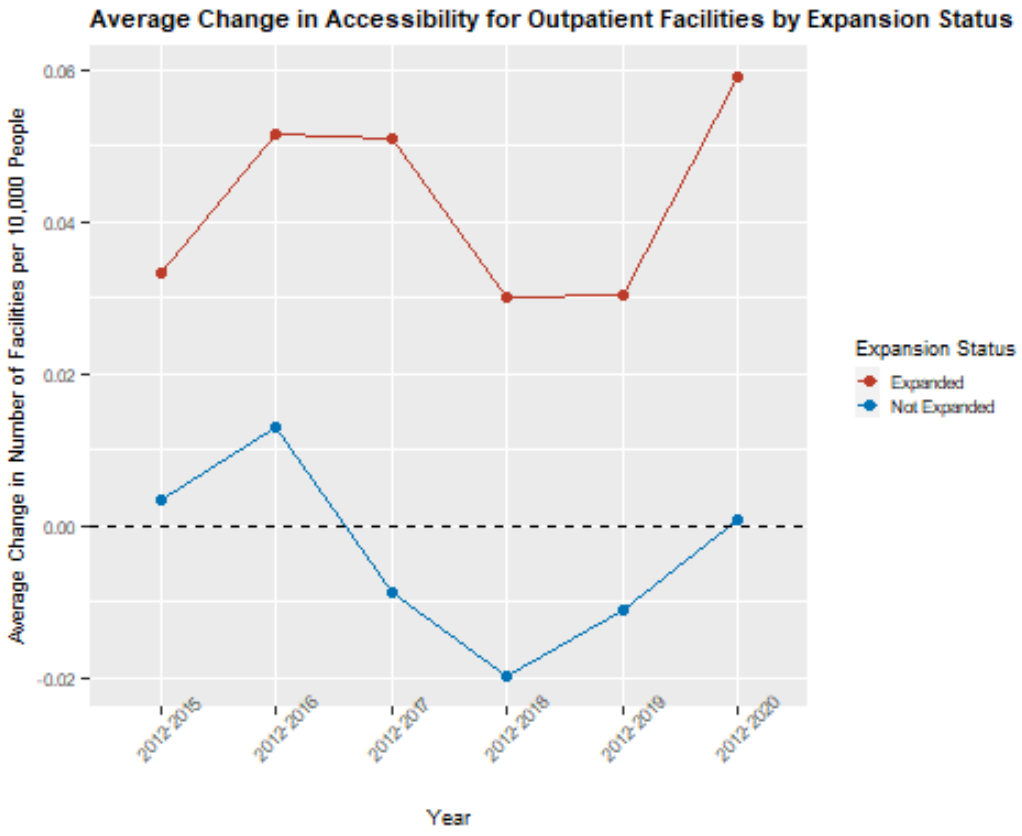


Figure 10. Average state-level changes in the accessibility of facilities offering mental health treatment within an outpatient service setting relative to pre-period (2012) levels.

Table 8 estimates a treatment effect of 0.046 on the accessibility of outpatient services. This effect is considered significant at the 1% level in the fixed-effects specification although this significance disappears again when fixed effects for state and year variables are not included. The relevance of these results is much more compelling than those for inpatient facilities, given the significance and greater

magnitude of the DID estimator coefficient. This coefficient estimates an average increase of 0.046 facilities per 10,000 people or 4.6 facilities for every 1 million people in a state.

Table 8. Multivariate regression analysis examining the association between state expansion status and the availability of facilities offering mental health services within an outpatient service setting.

Accessibility of Outpatient Facilities		
	Dependent variable:	
	Access Score	
	felm	*OLS*
	(1)	*(2)*
Post		*-0.004*
		(0.037)
Expanded		*-0.061*
		(0.045)
Mean Household Income		*0.00001***
		(0.00000)
Black (%)		*-0.002*
		(0.001)
Hispanic (%)		*-0.002*
		(0.002)
Unemployed (%)		*-0.025****
		(0.010)
Uninsured (%)		*-0.009***
		(0.004)
Below Poverty (%)		*0.027****
		(0.007)
HS Graduate (%)		*0.021****
		(0.006)
College Graduate (%)		*-0.008***
		(0.004)
*Post*Expanded*	*0.046****	*0.046*
	(0.016)	*(0.045)*
Constant		*-1.803****
		(0.640)
Observations	*287*	*287*
R2	*0.926*	*0.283*
Adjusted R2	*0.912*	*0.254*
Residual Std. Error	*0.044 (df = 239)*	*0.127 (df = 275)*
F Statistic		*9.874*** (df = 11; 275)*
Note:		*p<0.1; p<0.05; p<0.01*

Effects of Medicaid Expansion on the Accessibility of Residential Facilities

Figure 11 examines changes in the accessibility of facilities offering services in a residential setting. Residential treatment is less intensive than inpatient treatment with regards to monitoring and setting characteristics. Inpatient treatment involves 24/7 monitoring, usually within a secure hospital setting. Residential treatments occur in more home-like environments and may be more long-term. The graph shows decreases in the level of average accessibility of residential facilities for both groups of states in essentially every post-period year. Compared to 2012 levels, the only net positive change in accessibility occurs between 2012 and 2015 in the expansion group. This change is negligible, and all other pairs of pre- and post-period years show a net drop in accessibility for these services.

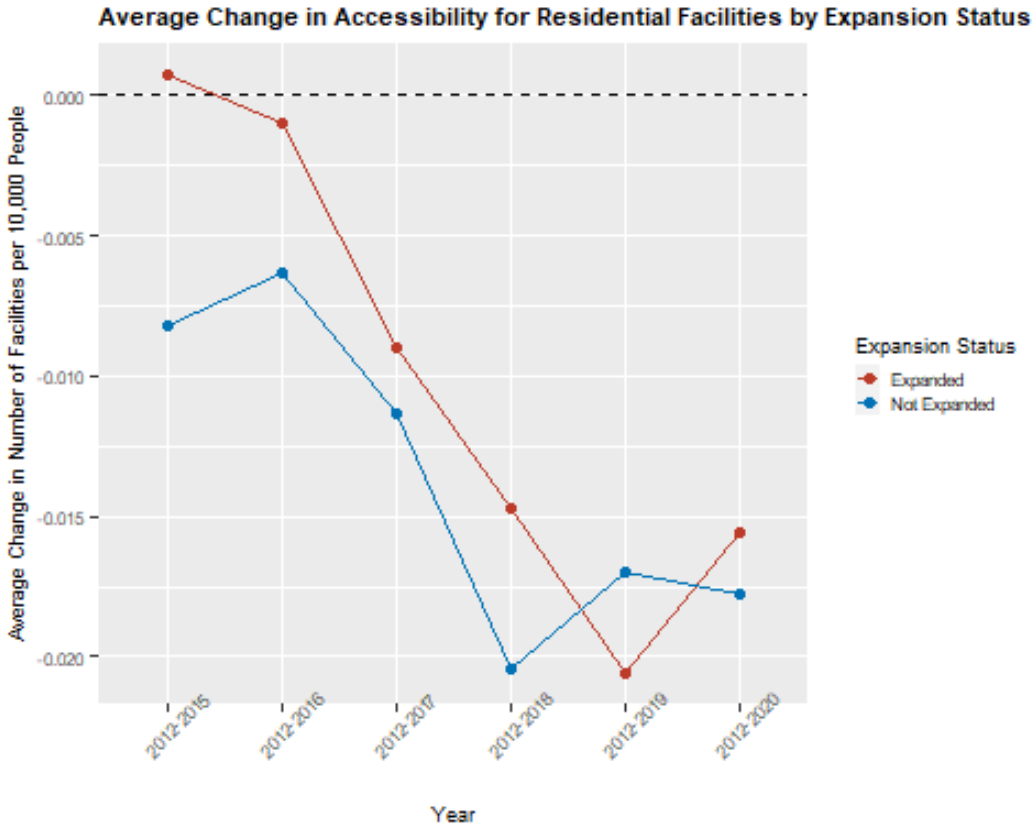


Figure 11. Average state-level changes in the accessibility of facilities offering mental health treatment within a residential service setting relative to pre-period (2012) levels.

Table 9 reinforces the information interpreted from the associated line graph, with a statistically insignificant coefficient on the DID estimator for all three model specifications. The coefficient is also

small in magnitude (0.003), indicating that there is not likely to be a relevant effect of Medicaid expansion on the average availability of residential mental health services.

Table 9. Multivariate regression analysis examining the association between state expansion status and the availability of facilities offering mental health services within a residential service setting.

Accessibility of Residential Facilities		
	Dependent variable:	
	Access Score	
	felm	*OLS*
	(1)	*(2)*
Post		*-0.013*
		(0.011)
Expanded		*0.017*
		(0.014)
Mean Household Income		*-0.00000****
		(0.00000)
Black (%)		*-0.002****
		(0.0004)
Hispanic (%)		*-0.001****
		(0.0005)
Unemployed (%)		*-0.011****
		(0.003)
Uninsured (%)		*0.001*
		(0.001)
Below Poverty (%)		*-0.010****
		(0.002)
HS Graduate (%)		*-0.010****
		(0.002)
College Graduate (%)		*0.009****
		(0.001)
*Post*Expanded*	*0.003*	*0.003*
	(0.006)	*(0.014)*
Constant		*1.280****
		(0.198)
Observations	*287*	*287*
R2	*0.898*	*0.421*
Adjusted R2	*0.878*	*0.397*
Residual Std. Error	*0.018 (df = 239)*	*0.039 (df = 275)*
F Statistic		*18.146*** (df = 11; 275)*
Note:		*p<0.1; p<0.05; p<0.01*

Effects of Medicaid Expansion on the Accessibility of Psychiatric Facilities

Figure 12 considers the accessibility of psychiatric facilities, which include both psychiatric hospitals and psychiatric units of a general hospital. Similar to the analysis of residential facilities, both groups of states show minimal changes in the average accessibility of psychiatric facilities for all post-period years examined. One year after the expansion program was enacted (2015), both groups of states show a decrease in this measure of accessibility compared to initial 2012 levels. In 2016, accessibility rose again to initial levels, although the net changes are small in magnitude for all years.

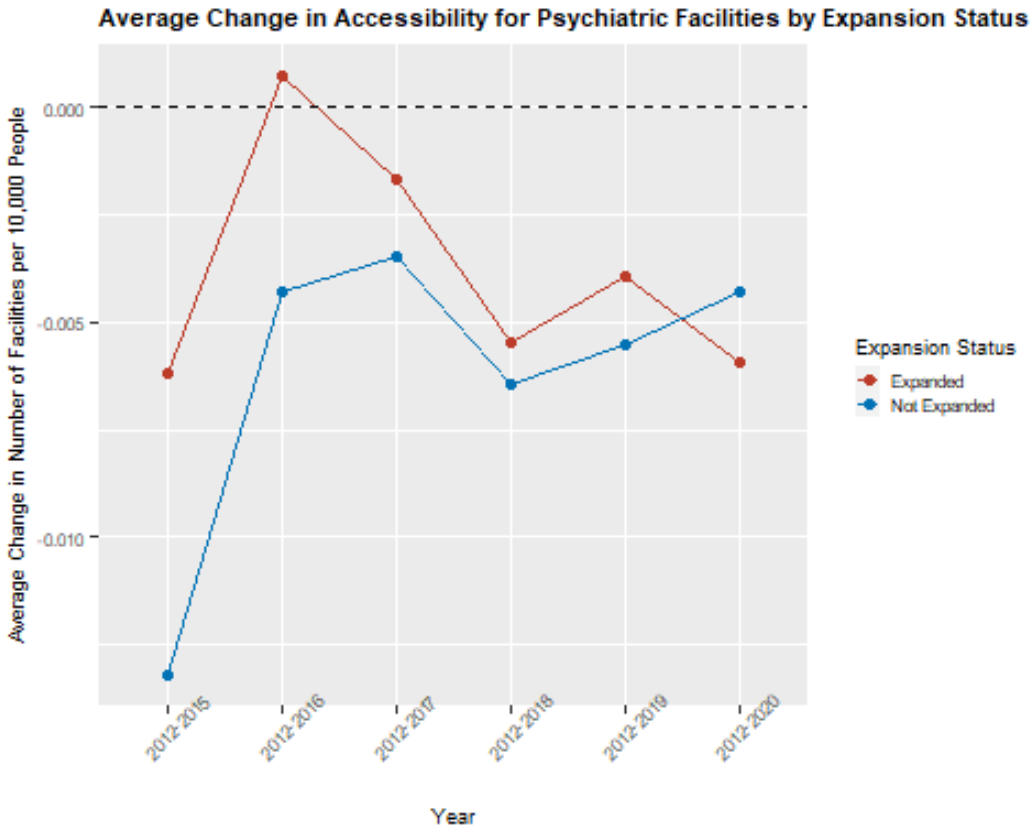


Figure 12. Average state-level changes in the accessibility of psychiatric facilities relative to pre-period (2012) levels.

The results obtained in **Table 10** reflect this, with a small and statistically insignificant coefficient on the DID estimator (0.002).

Table 10. Multivariate regression analysis examining the association between state expansion status and the availability of psychiatric facilities offering mental health services.

Accessibility of Psychiatric Facilities		
	Dependent variable:	
	Access Score	
	felm	*OLS*
	(1)	*(2)*
Post		*-0.006*
		(0.005)
Expanded		*0.003*
		(0.006)
Mean Household Income		*0.00000****
		(0.00000)
Black (%)		*0.001****
		(0.0002)
Hispanic (%)		*-0.0005***
		(0.0002)
Unemployed (%)		*-0.010****
		(0.001)
Uninsured (%)		*-0.001***
		(0.001)
Below Poverty (%)		*0.005****
		(0.001)
HS Graduate (%)		*0.001**
		(0.001)
College Graduate (%)		*-0.002****
		(0.0005)
*Post*Expanded*	*0.002*	*0.002*
	(0.003)	*(0.006)*
Constant		*-0.092*
		(0.086)
Observations	*287*	*287*
R2	*0.861*	*0.440*
Adjusted R2	*0.833*	*0.417*
Residual Std. Error	*0.009 (df = 239)*	*0.017 (df = 275)*
F Statistic		*19.633*** (df = 11; 275)*
Note:		*p<0.1; p<0.05; p<0.01*

Effects of Medicaid Expansion on the Accessibility of Medicaid-Accepting Facilities

Finally, the accessibility of Medicaid-accepting facilities is examined in **Figure 13**. This graph shows a net increase in the number of facilities that accept Medicaid payments per 10,000 people across all pairs of years and both groups of states examined. The expansion states have on-average greater

increases in these accessibility levels for every post-period year compared to non-expansion states. However, even non-expansion states maintain increased accessibility levels for Medicaid-accepting facilities throughout the post-period relative to the initial 2012 level.

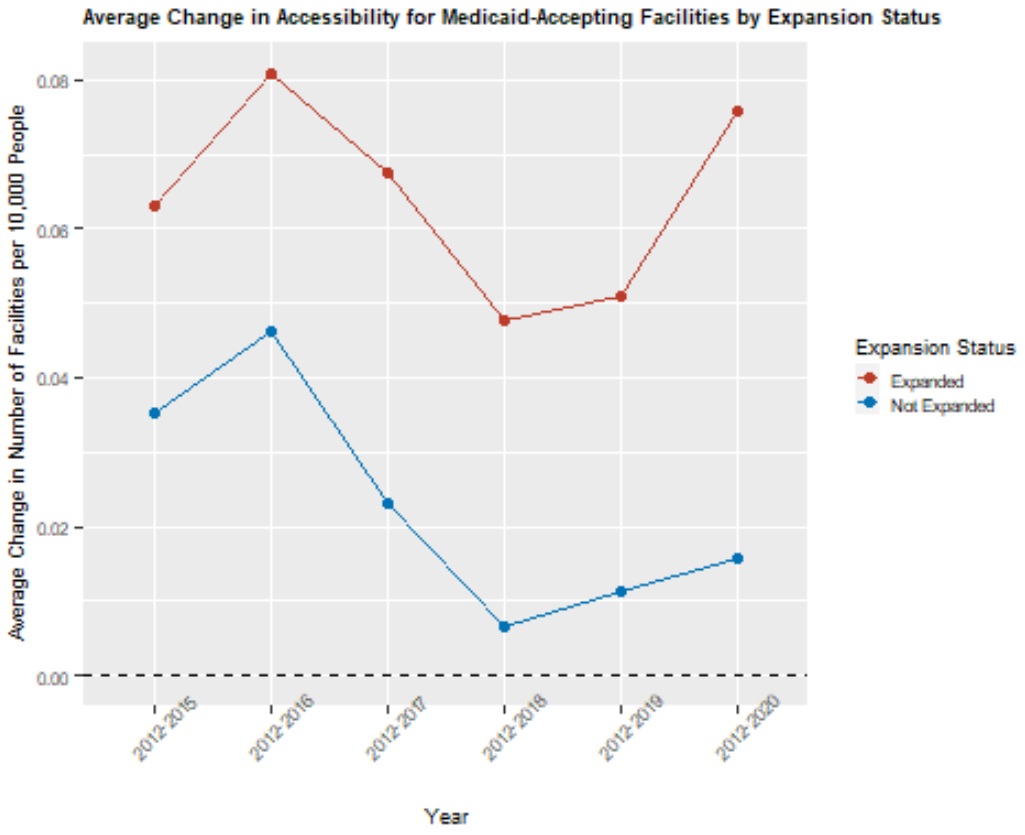


Figure 13. Average state-level changes in the accessibility of facilities offering mental health treatment that accept Medicaid payments relative to pre-period (2012) levels.

The estimated coefficient for the treatment variable in the fixed effects specification is significant at the 1% level in **Table 11**. The coefficient estimates a treatment effect of increasing accessibility by 0.041 facilities per 10,000 people. This result is once again insignificant according to the specifications which only control for selected state-level covariates. However, this result is indicative of a potential relationship between expansion status and the availability of Medicaid-accepting mental health facilities.

Table 11. Multivariate regression analysis examining the association between state expansion status and the availability of Medicaid-accepting facilities offering mental health services.

Accessibility of Medicaid-Accepting Facilities		
	Dependent variable:	
	Access Score	
	felm	*OLS*
	(1)	*(2)*
Post		*0.023*
		(0.038)
Expanded		*-0.034*
		(0.046)
Mean Household Income		*0.00000**
		(0.00000)
Black (%)		*-0.003***
		(0.001)
Hispanic (%)		*-0.004***
		(0.002)
Unemployed (%)		*-0.038****
		(0.010)
Uninsured (%)		*-0.008**
		(0.004)
Below Poverty (%)		*0.025****
		(0.008)
HS Graduate (%)		*0.014***
		(0.006)
College Graduate (%)		*-0.005*
		(0.004)
*Post*Expanded*	*0.041****	*0.041*
	(0.016)	*(0.047)*
Constant		*-1.044*
		(0.662)
Observations	*287*	*287*
R2	*0.937*	*0.349*
Adjusted R2	*0.925*	*0.323*
Residual Std. Error	*0.044 (df = 239)*	*0.132 (df = 275)*
F Statistic		*13.431*** (df = 11; 275)*
Note:		*p<0.1; p<0.05; p<0.01*

Discussion

This study examined the effect of enacting the Medicaid Expansion program in 2014 on the accessibility of facilities offering mental health services in the U.S. An initial descriptive analysis of the

data obtained from the SAMHSA facility directories revealed several parallel trends in accessibility between the treatment (i.e.. expanded) and control (i.e.. non-expanded) states throughout the period examined. However, for all three measures of accessibility utilized in this analysis, expansion states had higher scores during both the pre- and post-periods. The initial examination of state-level trends in accessibility was not suggestive of a significant difference in the magnitude of changes in accessibility between the two groups of states. When defining accessibility by the number of facilities offering mental health services per 10,000 people in a state, average accessibility scores showed slightly greater increases in expansion states although the initial increases in the first two years following expansion were not maintained throughout the whole post-period. Using this measure of accessibility offered the most compelling evidence for any potential positive effect of the expansion program on mental health care accessibility. This was evident from the visual analysis as well as the regression results. The only potentially significant coefficient on any of the DID estimators used in the primary regressions was found when using this measure of accessibility and a fixed-effect specification. Even in this case, the estimated effect was relatively small in magnitude (0.032) and only significant at the 10% level. Neither of the other two definitions of accessibility yielded significant treatment effect estimates.

The descriptive analysis presented some other findings regarding the distribution of mental health facilities in the U.S. When comparing zip-code-level accessibility scores for metropolitan and nonmetropolitan counties, we find that zip-codes in metropolitan counties have much higher levels of access. This difference is present in the pre-period (2012) but becomes even more pronounced in the six post-period years. Upon further analysis, we find that the difference in average zip-level accessibility between metro and non-metro areas is mostly a result of differences in non-expansion states. This relates to previous findings that identify an uneven distribution of mental health resources with rural areas being more likely to face shortages. This is particularly problematic as rural areas in non-expansion states appear to have the most to gain with regards to mental health care accessibility. When looking at a measure of regional need for mental health care (HPSA codes for MH), zip-codes in both expansion and non-expansion states are far more likely to be within a county that is wholly designated as a mental health

professional shortage area when found in a non-metro county. Given previous findings of higher levels of unemployment and uninsurance in non-urban areas, the potential effects of the Medicaid Expansion program on mental health care availability are especially pertinent to these underserved regions.

Rates of Medicaid-acceptance amongst mental health professionals presents another potentially important limitation to the benefits of the expansion program. Even if the program does have a positive effect on the geographic availability of facilities offering mental health services, these facilities must also accept Medicaid to make a difference for the new beneficiaries. In this analysis, the average proportion of facilities accepting Medicaid increases from about 80% to 90% between the pre- and post-periods in both groups of states. This is a relatively high value compared to prior reports of low rates of Medicaid acceptance amongst mental health providers. This difference may arise as a result of using facility-level rather than provider-level data, as some of the facilities included are not entirely (or even primarily) concerned with behavioral health issues. General health practitioners are more likely to accept Medicaid insurance plans, and this may be reflected in the overall high rates of acceptance among the facilities included in this analysis. However, there is still a noticeable improvement in rates of Medicaid-acceptance among this sample following enactment of the program in 2014. This is evident in both expansion and non-expansion states, indicating that the program itself is unlikely to be the driving force behind the higher rates of Medicaid-acceptance.

This paper also examined potential heterogeneities in the effect of the expansion program on mental health facility availability according to certain facility characteristics. Of the five characteristics considered, two showed potentially relevant results. The average accessibility of outpatient facilities showed greater improvements in expansion states compared to states that have never expanded. Access scores for facilities offering services in an outpatient setting were higher in all the post-period years examined relative to the score in the pre-period for expansion states. In non-expansion states, this measure remained much closer to initial pre-period levels and did not show significant or sustained improvements throughout the period examined. This was reflected in the regression results, where the DID estimator was found to be significant in the fixed-effect specification.

Similar results were found when looking at the availability of Medicaid-accepting facilities. Although the number of Medicaid-accepting facilities increased beyond pre-period levels in both groups of states, the magnitude of change was greater for expansion states for all six post-period years. The DID regression results again indicated a significant treatment effect within the fixed-effect model.

The other three facility characteristics examined (inpatient service setting, residential service setting, and psychiatric facilities) did not show any significant improvements in the expansion or non-expansion states either visually or in the regression results. The coefficients on the DID estimator for all three of these models were very small in magnitude and statistically insignificant. These results also relate to recent shifts in the mental health care system, as more services have been taking place in outpatient rather than inpatient settings and funding for residential care has decreased since the mid-20th century. Because insurance plans are more likely to exclude inpatient services, decreasing trends in uninsurance rates and programs intended to improve coverage may contribute to these shifts in the distribution of treatment settings. This result may also be related to the increasingly important role of primary care providers in the provision of mental health care, as greater reliance on integrative or collaborative care models might shift demand for services away from facilities primarily intended to treat behavioral health concerns and towards providers operating within outpatient settings.

Results from this study as well as findings from related literature suggest several policy interventions to improve upon aspects of the mental health care delivery system and diminish the amount of unmet need for mental health services. The importance of primary care settings and providers in achieving these goals should not be overlooked. Given the uneven distribution of facilities offering mental health services within the U.S., people in many areas continue to struggle with inaccessibility as defined by geographic proximity to resources. These observations obtained from the heat maps created for this analysis and the increasing reliance on outpatient treatment settings in mental health care treatment suggest the relevance of primary care physicians when considering ways to expand accessibility. Policies aimed at further integrating mental health care within primary care settings will be especially useful for rural populations where mental health care specialists are often in shortage.

Implementing integrative and collaborative care models within more facilities could overcome some of the issues associated with the uneven distribution of facilities. This could involve collaborative provider teams consisting of both primary care physicians and mental health specialists working jointly to manage patients with physical and behavioral health concerns. Alternatively, more comprehensive behavioral health treatment training could be given to a wider range of healthcare providers, especially when the availability of behavioral health specialists is limited.

Improving Medicaid reimbursement policies for important elements of behavioral health treatments in both primary care and designated mental health settings would allow for greater availability of resources across a wider range of service settings. For example, implementing policies that adequately reimburse all providers involved within collaborative care models for services such as prevention, screening, and case management will incentivize the regular provision of these services. Being careful to reimburse primary care providers and mental health specialists equally will allow behavioral health care to become more widely accessible in both primary care and specialized settings. This is important because each setting may be useful for different cases and overdependence on outpatient primary care settings could result in some patients not obtaining appropriate care. Although it is important to encourage the provision of behavioral health care in primary care settings, advantageously reimbursing primary care providers relative to behavioral health specialists could lead to further declines in the number of Medicaid-accepting mental health professionals. Policies aimed at standardizing and expanding the set of mental health benefits included in Medicaid plans could create more comprehensive and structured benefit packages for a greater number of beneficiaries. For example, making the currently optional services mandatory in benefit plans and reducing or eliminating limits on inpatient and residential treatments could ensure that adequate care is accessible across Medicaid plans in all states. Generally diminishing the amount of flexibility that individual states have in determining their Medicaid benefits could enforce widespread adoption of more comprehensive behavioral health benefit packages and improve parity for these services compared to the benefits included for physical health concerns. As indicated by the declining availability of inpatient, residential, and psychiatric facilities in some states,

policies to increase workforce and infrastructure development could diversify the service settings and facility types available in the U.S. mental health care market. Putting more money towards new residential and inpatient facilities could be especially beneficial for patients with serious mental illnesses for whom outpatient care may not be sufficient to address their health concerns.

It has been shown in this analysis that rural areas in non-expansion states have the most to gain with regards to mental health care resources availability. Expanding Medicaid in these states could hypothetically increase the number of beneficiaries and thus spur demand for mental health services. Since the expansion program is shown to be linked to an increase in the number of Medicaid-accepting facilities per 10,000 people at the state-level, enforcing implementation of the program across all states would improve access to mental health care for potential new Medicaid beneficiaries in states that have not yet expanded the program. Taken together, implementation of the program would likely lead to a decrease in the amount of unmet need for mental health services, especially in currently underserved rural areas.

Several study limitations should be addressed. First, the classification of mental health facilities in the SAMHSA directories are quite broad and may not be entirely representative of how accessibility to mental health resources is changing. For example, a general hospital that offers minor mental health services will not make as much of an impact on improving accessibility for those with serious mental illness as a new psychiatric hospital, although these would be weighted equally in this analysis. Conducting a similar analysis at the provider-level may help with this and allow for filtering of resources designated primarily for mental health. Second, there is no information within the data sample used about treatment capacity for patients with mental health issues or average waiting times, which may result in delays in treatment. Third, some individuals are likely to seek mental health services outside of their zip-code and may be willing to commute significant distances to obtain proper treatment. This is not accounted for in any of the measures of accessibility defined in this paper. Finally, the only measure of mental health need prior to enactment of the expansion program used in the paper is the county-level HPSA codes. According to this measure, need for mental health care seems relatively similar across

expansion and non-expansion states, but considering a more extensive reflection of mental health need may help with interpreting any effect of the program in expansion states.

Conclusion

This study contributes to existing literature related to mental health care accessibility and focuses on the effects of the Medicaid expansion program on the overall availability of related services throughout the U.S. By constructing a dataset which synthesizes facility directories from several years, this study examines state-level trends in various measures of accessibility over an 8-year period. Although results obtained from the primary regression analyses were not particularly suggestive of any major changes in the availability of facilities offering mental health services, findings from this study reveal some important aspects involved in the provision of mental health care services. For example, findings from this study suggest increases in Medicaid-acceptance rates among mental health facilities and shifts in the availability of treatments offered in various service settings.

Several opportunities for future research related to this study are suggested. Regarding the willingness of people to travel outside of their zip-code to obtain mental health services, various techniques could be employed to improve upon accessibility measures used in this study. Using the centroids of zip-codes to calculate buffer regions around each could create a more realistic description of the geographic availability of mental health care resources. People living in non-urban areas where mental health care resources tend to be more sparsely distributed may be especially willing to travel further distances to obtain proper treatment and encompassing this in future analyses will be important in future research related to healthcare accessibility. Furthermore, this study focused primarily on state-level measures of accessibility since the treatment variable of interest (whether the expansion program was enacted or not) varied at this geographic level. However, the same sample may be used to examine accessibility measures at smaller geographic levels. For example, examining average accessibility scores across zip-codes could allow for further consideration of any heterogeneous effects of the expansion program across rural and urban areas and across areas with varying rates of minorities. Uncovering any

changes in the geographic distribution of mental health care resources before and after policy implementation could demonstrate which types of regions are most impacted by the increases in Medicaid coverage. Other factors mentioned in the sections above may also be relevant in the analysis of the effect of the expansion program on mental health care accessibility. First, looking into federal contribution rates to state Medicaid programs may reveal a link between reimbursement rates and the availability of services. Providers in states that have higher federal contribution rates generally obtain higher reimbursements, which may incentivize working with Medicaid patients and result in higher numbers of Medicaid-accepting facilities when the program is expanded. Second, incorporating variations in state policies regarding Medicaid reimbursement for primary care services could be relevant to this analysis. States that pay higher rates for primary care services generate an incentive for primary care physicians to accept Medicaid patients compared to states that do not enforce these higher rates. Given the growing importance of primary care physicians within the mental health care delivery system, these policies may lead to increased levels of accessibility for relevant services offered within primary care settings especially within expansion states, where increased demand is induced by the higher rates of coverage. Finally, considering variation in state-level Medicaid "carve-out" policies for behavioral health services may be pertinent to this analysis of the effects of expansion on mental health care availability. It has been found that Medicaid reimbursements favor mental health professionals when Medicaid managed care organizations use carve-out systems to deliver mental health services. States that utilize these carve out networks might be expected to have greater increases in mental health care resources, especially for facilities and providers primarily intended for the treatment of these concerns. Especially if mental health specialists are advantageously reimbursed relative to primary care providers within states that utilize this payment system, there may be greater improvements in the availability of relevant services within these states following enactment of the expansion program. Examining the effect of these variable payment incentives may have important ramifications for policies related to Medicaid reimbursements aimed at improving accessibility to mental health care providers and facilities.

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